JULY 1956

ROADS and STRE

HIGHWAYS . BRIDGE

A GILLETTE

15

DS . HEAVY CONSTRUCTION

ION

Accepted as Controlled Circulation Publication at Coder Rapids, Journ

CARBIDE INSERT?

TIMKEN® car ert bits give more hole per bit through blocky granite on Granite Falls Fishway

MULTI-USE?

Washington. OPE

your best bet for the best bit

... for every job

OPERATING CONDITIONS: Drilling of blast and dowel holes in hard, seamy granite.

TIMKEN

THE Scheumann & Johnson Company of Seattle had to drill blast and dowel holes in extremely hard, seamy granite when constructing baffles for the world's largest "vertical-baffle" salmon fishway at Granite Falls, Washington. For highest economy drilling through this hard ground, they chose Timken carbide insert bits for the job.

Timken carbide insert bits permitted high speed drilling with minimum bit changes. And the job superintendent reports that the Timken carbide insert bits made it possible to drill out full increments of drill steel.

But Timken carbide insert bits may not be the best answer for all your drilling problems!

In softer, less abrasive ground, Timken multi-use bits, correctly controlled and reconditioned, give you the lowest cost per foot of hole when you can drill out full increments of drill steel.

Both types of Timken bits are interchangeable in the same thread series. And a wide range of different Timken bits fit the same drill steel. When the ground changes, you can switch bits quickly and easily, right on the job.

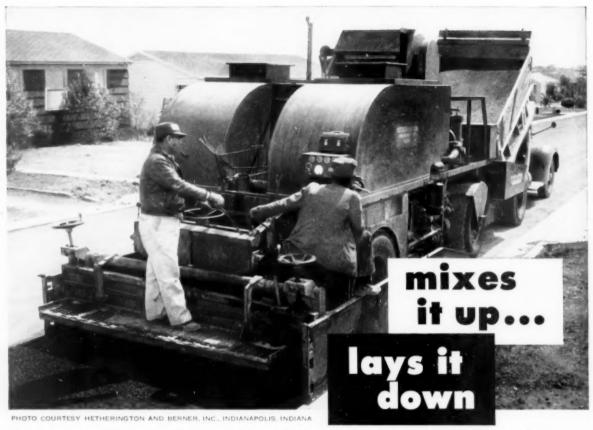
The Timken Rock Bit Engineering Service can offer you over 20 years of experience in recommending the best bit for the job. We'll be happy to help you. Write: The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken threaded



Timken threaded carbide insert rock bit



Three Men, Chrysler Power and a Moto-Paver ready an entire street for rolling!

Soon the gravel road may go the way of the covered bridge. With machines around like the Hetherington & Berner Moto-Paver, any paving job can be done quickly, easily, economically.

A completely self-contained unit, the Moto-Paver mixes aggregate in prearranged proportions, discharges mixture onto road surface, spreads and strikes off paving material to meet specified grade and crown requirements.

This contractor is truck-feeding aggregate directly into the Moto-Paver hopper; as the paver moves along it pushes the truck ahead of it. Other contractors may take materials from a windrow using a loader attachment. Three men can oversee the entire operation.

Sounds easy, doesn't it? It is—with reliable high-speed *industrial* power. And for this manufacturer, as for so

many others, this means only one thing —Chrysler Industrial Power—in-line 6 or V-8 engines. Two Chrysler Industrial Engines power the Moto-Paver. An Ind. 32-265 cubic inch displacement engine, teamed with Chrysler gýrol Fluid Coupling and 4-speed transmission, moves the unit smoothly, effortlessly. An Ind. 22-413 cubic inch displacement engine and 4-speed transmission drives mixer, discharge, and spreading components.

In the 230 to 413 cubic inch displacement range, you won't find a better-engineered, better-built, more highly respected industrial engine than Chrysler. "Power by Chrysler Industrial Engine" is a feature contractors regard as indicating quality performance, economical operation.

Chrysler Industrial Engines can be

ordered factory-equipped with your choice of 3, 4 or 5-speed transmission, heavy-duty clutch and power takeoff, velocity, belt or gear-driven governors. See a Chrysler Industrial Engine Dealer—ask him about the new dual-cooled Chrysler Industrial Torque Convertor. If you prefer, write:

Dept. 107, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.



CHRYSLER INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION

CHRYSLER CORPORATION

HORSEPOWER

WITH A PEDIGREE

. . . for more details circle 195, page 16



So light, so strong because it's made of Beth-Cu-Loy

Beth-Cu-Loy drainage pipe is so light it can easily be manhandled. Even long lengths are unloaded and placed without special lifting equipment. At the same time, Beth-Cu-Loy pipe has a world of strength because it's made of corrugated steel, sheet-metal in its strongest form.

Two mighty compelling reasons why builders of highways are using an increasing mileage of Beth-Cu-Loy culvert and drainage material!

But only the beginning. Once in the trench, pipe made of Beth-Cu-Loy is easy to connect and maintain in grade and alignment. No fancy trenching is needed, nor cradling in unstable soils, for a BethCu-Loy culvert flexes with shifting and freezing actions. It has high impact- and vibration-resistance, and stands off corrosion through its galvanized coating and the copper content in the steel.

Beth-Cu-Loy culvert sheets conform to the rigid standards of the AASHO specifications, and are made by Bethlehem for fabricators of drainage pipe. If you would like further information about Beth-Cu-Loy Sheets, or the names of nearby concerns who make them into drainage materials, just get in touch with the Bethlehem district sales office nearest you.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast
Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



ROADS AND STREETS

JULY, 1956

NATIONAL AFFAIRS		PAVING AND SURFACING					
Washington News Letter By Duane L. Cronk, Washington Editor	19	Suggested Quality Control for Concrete By Glenway Maxon, Consulting Engineer	72				
Safeguards in Federal Spending Urged	49	Further Discussion on Oliensis Spot Test	113				
EDITORIAL "Briefly Noted"	63	Lightweight Filler for Asphaltic Mixes By H. L. Lehmann, Testing and Research Engineer, and Verdi Adam, Senior Assistant Research Engineer, Louisiana Department of Highways	117				
		"BLUEPRINT" FOR EXPANDED PROGRAM					
AIRFIELD DEVELOPMENTS		II — The Bureau's New Responsibility	96				
Heaviest Runway Planned as Atomic Prototype	44						
New Criteria for Airfield Pavements	87	DEPARTMENTS Court Providers					
		Court Decisions					
EARTHMOVING AND EXCAVATION Big Borrow Loads Moved Over Riverbed Haul Road Practical Pointers on Earthmoving and Embankments By J. V. Clarke, Assistant Construction Engineer, Virginia Department of Highways	53 68	New Publications Personals Engineering Digest By John C. Black, Associate Editor Views and Comments By H. G. Nevitt	102				
		WHERE TO BUY IT					
EQUIPMENT MAINTENANCE		Reader Coupon Page	16				
M-K Sends Mechanics to School	62	1 0	, 128				
		Manufacturers' Literature	131				
AGGREGATE PRODUCTION		Clearing House (Used Equipment)	133				
Home Made Dredge Supplies Sand-Gravel Plant	64	With the Manufacturers and Distributors	146				

Coming Articles =

10 MILLION TONS OF TURNPIKE AGGREGATES

A GILLETTE PUBLICATION

Several on-the-job reports on examples of the 31 crushing plants set up along the Kansas Turnpike.

PRESTRESSED CONCRETE CONFERENCE REVIEW

Technical papers and panel discussions held at Hollywood, Fla., will be reviewed.

AIRSTRIPS POSE HUGE MAINTENANCE PROBLEM

A series of staff articles on the pavement conference held by the Air Force recently at Colorado Springs.

CONCRETE ROAD-MIXED EXPERIMENTALLY

VOLUME 99

NUMBER 7

Test section in California built with travel plant, showing challenging production possibilities.

Also Coming Along: Mix Adjustment Saved Contractor \$30,000 on Cement. . . Job History of a Bituminous Stabilization Project. . . How One State is Tackling its Materials Problems. . . Illinois' First All-Wekled Girder Bridge. . . Peat Removal Problem and Methods on Indiana Turnpike.

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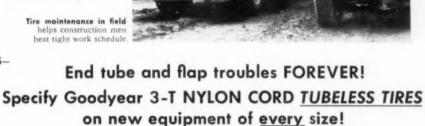
14.8 MILLION YARDS TO MOVE, 56 BRIDGES TO BUILD,

IN 29.6 MILE DALLAS-FORT WORTH "SIX-CHUTER"!



Unlike most other turnpikes, the 6-lane Lone Star Speedway is being cut, filled, borrowed and spanned along a populated toute, crisscrossed by many heavily travelled roads. To add to contractors' headaches, up to 300,000 gallons of water a day have to be trucked in for compacting. Note how self-propelled scrapers are tandemed to tackle the sunhardened soil. Tires are Goodyear's wide-base Hard Rock Lugs-now standard on much original equipment.

> Tire maintenance in field helps construction men beat tight work schedule



Goodyear tubeless tires and rims are now standard on foremost original equipment-or supplied on specification.

In them, you get the regular Goodyear cost-cutting features PLUS many new savings of time, trouble and tire-cost-per-yard, possible only with Goodyear TUBELESS.

TO MENTION JUST A FEW: No tube or flap troubles-no tube replacements-easier mounting and dismounting-airtight assembly-cooler running -slow leaks instead of blowouts-easier repairs-simpler, re-usable valve-parts.

Get all the facts from your helpful Goodyear dealer. Goodyear, Truck Tire Dept., Akron 16, Ohio.

Buy and Specify



MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND Road Lug, Sure-Grip, All-Weather - T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

OTHER 3-T NYLON CORD TIRES-CONVENTIONAL

OR TUBELESS! HARD ROCK LUG HARD ROCK RIB ALL-WEATHER SURE-GRIP ROAD LUG

Look for this nearby Goodyear dealer sign for better tire valuesbetter tire care.

, for more details circle 214, page 16

ROADS AND STREETS, July, 1956



Just a squeeze sets the fastening stud in steel or concrete!

THAT'S HOW SIMPLE IT IS—a flex of the finger—to anchor fixtures securely with the Remington Stud Driver. Off goes the power load, the stud is anchored into steel or concrete—straight as an arrow. No predrilling or outside power source required!

You can set both ½" and ¾" diameter studs with the Remington Stud Driver—up to 6 studs per minute either size. There are 40 different styles and lengths of Remington Studs to choose from. With this one tool, you can take on every stud-fastening job—light, medium and heavy-duty—and save time and

money on every one of them! Get full details by mailing coupon below.





STUD DRIVER

Industrial Sales Division	RS-7
Remington Arms Compan	
Bridgeport 2, Conn.	

Please send me your free booklet which shows how I can speed my job and save with the Remington Stud Driver.

Name_____Position____

Address

. . . for more details circle 235, page 16

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 63 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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"We've overhauled our six-year-old No. 12 once never done anything to our three-year-old grader"

Bud King, Missoula, Mont.

Bt d King is describing his CAT* No. 12 Motor Graders, working on a 4.76-mile construction job of U. S. Highway 93 near Arlee, Mont. It is a remarkable tribute when you see the rough conditions in which these No. 12s work.

"I've been running big yellow equipment for 25 years," Bud King explains. "As far as graders are concerned, there isn't any that holds a candle to Caterpillar. We've overhauled our six-year-old No. 12 once—never done anything to our three-year-old grader but work it hard."

The No. 12 is trimming slopes of a new subgrade, most of it containing heavy rock. This is the type of rough going which shows the rugged characteristics of Cat Motor Graders to best advantage.

For under such conditions, it is doubly important that the unit is built by *one* manufacturer. That way, engine, blade capacity and working speed are carefully matched for sure-footed traction and high production. Here, too, it is important that the blades are made of high-strength alloy steels and cutting edges and bits of high-carbon steel. Here's where you appreciate having

the circle drawbar and blade supporting circle built of heavy box sections to withstand maximum loads.

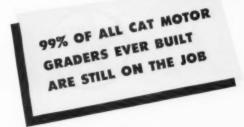
And new tubeless tires are available at no extra cost, eliminating 80% of down time caused by tire trouble. They run cooler, last longer, give better puncture and blowout protection.

Have your dealer give you full details on this rough-and-ready motor grader. He'll tell you, for instance, about the exclusive new oil clutch which can operate up to 1500 hours without adjustment. But he'll do more than talk, He'll demonstrate—on your job. You name the date.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



. . . for more details circle 194, page 16

How contractors benefit by TEXACO SIMPLIFIED LUBRICATION PLAN

HERE'S ONE EXAMPLE. All equipment used in the construction of Hungry Horse Dam, Montana, was 100 per cent Texacolubricated. The contractor wrote:

"The time and confusion saved by the Texaco Simplified Lubrication Plan are incalculable. Not only is it more economical to use a small number of lubricants, but there is little chance of error in application ... a big factor in keeping our equipment on the job and our maintenance costs low."

The Texaco Simplified Lubrication Plan is adaptable to all types of heavy construction jobs and working conditions. The lubricants recommended may vary, but the object is always to confine all major lubrication to no more than six products. For example:

- 1. ENGINE LUBRICATION: Use one of the famous Texaco Ursa Oils—especially designed to make diesel and heavy duty gasoline engines deliver more power with less fuel and fewer overhauls.
- **2. CHASSIS LUBRICATION:** Use *Texaco Marfak*. It won't jar or squeeze out, gives

longer lasting protection against dirt, wear and rust.

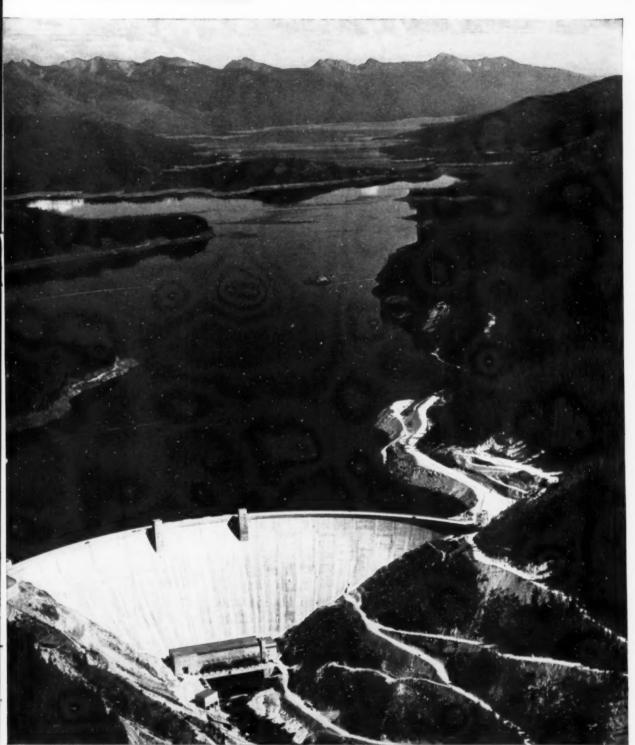
- 3. WHEEL BEARING LUBRICATION: Use Texaco Marfak Heavy Duty. It seals out dirt and moisture, seals itself in—assuring safer braking, longer bearing life. No seasonal change required.
- **4. CRAWLER TRACK LUBRICATION:** Use *Texaco Track Roll Lubricant*. It gives effective, lasting protection against dirt, water and wear.
- **5.** AIR COMPRESSOR LUBRICATION: Use *Texaco Regal Oil R&O*. It keeps systems clean and efficient. Also ideal hydraulic fluid prevents rust, sludge and foam.
- **6. ROCK DRILL LUBRICATION:** Use *Texaco Rock Drill Lubricant EP*. It protects against wear... prevents rust whether drills are running or idle.

Enjoy the benefits of the Texaco Simplified Lubrication Plan on your next project. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Hungry Horse Dam and Power Plant, Hungry Horse, Montana. Dam is 564 feet high, 2,115 feet long at the crest and contains more than 3,000,000 cu. yds. of concrete. Four generator units have a combined capacity of 285,000 kilowatts. Texaco Simplified Lubrication Plan aided on-schedule completion.





BUREAU OF RECLAMATION PHOTO

Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

. . . for more details circle 251, page 16

ROADS AND STREETS, July, 1956

KOEHRING WORK CAPACITY in action . . .



Take another look at this Mid-West quarry operation. It introduces the ¾-yard 305 — latest in a new series of Koehring heavy-duty excavators and cranes. Better check its all-around versatility and extra work capacity for digging, lifting and material-handling (more details are listed below).



To eliminate a bottleneck on this highway widening job, it was necessary to rebuild bridge, and widen the approaches. Concrete pilings were set and driven by Koehring 405 crane. It has up to 20-ton lift capacity, boom lengths from 40 to 90 feet. Or, for maximum reach, 80foot boom can be used with 15 to 30 feet of jib-



On 13.4-mile highway contract in one of the central states, 1,500 to 2,000 tons of aggregates were handled daily by Koehring 605 clamshell crane. Its wide work-radius speeded stockpiling, and charging into Johnson bin. Contractor also maintained fast schedule at other end of job, where two Koehring 34-E twinbatch" pavers poured 24-foot concrete pavement, 9 inches thick.

Here are some figures that will interest you:

KOEHRING MODEL	SIZE DIPPER	LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load.)							
205 CRAWLER	1 ₂ -Yd.	20,000 lbs.	at 10-foot radii						
205 ON RUBBER	12-Yd.	30,000 lbs. 13,700 lbs.	at 12-foot radius						
305 CRAWLER	₹ ₄ -Yd.	30,000 lbs.	at 12-foot radius						
305 ON RUBBER	³4-Yd.	50,000 lbs. 15,800 lbs.	at 10-foot radius at 30-foot radius						
405 CRAWLER	1-Yd.	40,000 lbs.	at 12-foot radius						
605 CRAWLER	1½-Yds.	72,300 lbs.	at 12-foot radius						
1205 CRAWLER	3-Yds.	190,000 lbs.	at 13-foot radiu						



K631

Want more information? Call Kochring distributor teday.



. . . for more details circle 226, page 16

PUSH THIS BUTTON... Bonus-Powered

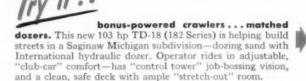
Try seconds-fast crawler starting. Famous International gasoline conversion, in-seat starting is standard equipment in all International diesel models! You get fast, positive, all-weather diesel starting, without fooling or fouling!

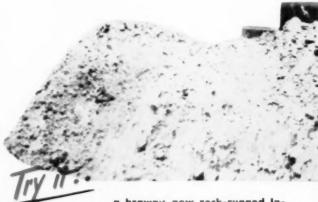
Try the lever-pull ease and power-transfer efficiency that new International Cerametallic engine clutch facings give you. And these self-cooling, long-lasting facings are of long-proved, well-known dry-type clutch design. No mystifying seals, circulators or "cold-sensitive" liquid to live with!

Try new International crawler steering. Unrivaled TD-24 Planet Power steering with capacity-boosting power on both tracks is responsive to even a school-boy's finger-tip touch! New hydraulic booster steering, in the new TD-18 and TD-14, reduces steering lever pull a big 75%. And the new T-6, TD-6, and TD-9 with spring-type steering clutch boosters are 25% easier to steer!

Above all, load up a new International crawler with matched International equipment—prove how bonuspowered performance boosts profit-production, wins operator preference, simplifies servicing. Choose from 7 heavy-duty crawler models, 41.5 drawbar to 200 net engine hp. Have your nearby International Distributor show you the bonus-powered performance package you need! Get a demonstration on your job today!

a new Dirt-Heaping, Bid-Beating International Payscraper*! Even where four-wheel prime mover units bogged down and slowed this Rio Grande Floodway Project to a standstill, two new, easy-loading, high-clearance 75 Payscrapers—push-loaded by a TD-24 Torque Converter crawler—were able to complete a critical job on schedule. Compare a payload-boosting new Payscraper to any other two-or four-wheel unit in any operating condition.





a brawny new rock-rugged International Payhauler*... for fast off-highway hauling. Haul rock or aggregate, ballast, or ore, off-highway—operate at speeds up to 38 mph—try a new 18-ton Model 65, or 24-ton Model 95, International Payhauler. Turbo-charged, diesel-powered with highest hp-to-ton capacity ratio on the market! Strongest main frame sections known. See and try an International Payhauler!





Try new International performance on your job!





INTERNATIONAL Construction Equipment

International Hervester Company, 180 N. Michigan Avenue, Chicago I. Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bettom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

-first choice for dependability!



World's Easiest Hoist to Maintain

- Can be completely serviced with ordinary truck tools!
- Exclusive tie-rod cylinder design speeds up inspection, maintenance or repair of cylinder!
- Precision-machined hydraulic pump easily serviced in field by average truck mechanic!

Contractor chooses Gar Wood-St. Paul dump bodies and hoists for 50-truck fleet on Patapsco Tunnel job

To speed work on the approach for Baltimore's new Patapsco Tunnel, Eastern Contractors, Inc. works a 50-truck fleet two grueling 10-hour shifts per day. For day-in, day-out dependability, Eastern's superintendent Mike Marcellino specified Gar Wood-St. Paul equipment on all units. Each rig hauls and dumps 30 loads of fill per shift, takes the shock of shovel loading 20 hours a day.

On big jobs everywhere, Gar Wood-St. Paul equipment is delivering the payloads contractors need, when they need them and at a lower net cost per payload hour. Design makes the difference! Gar Wood-St. Paul dump bodies are stress-tested to put strength where it's needed, eliminating excess weight. Strong-Arm hoists are designed for greater stability and faster, safer dumping regardless of grade or load distribution.

Get all the facts about the most dependable, most advanced line of truck equipment on the market. Call your Gar Wood-St. Paul distributor, or write to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Mich.

GAR WOOD INDUSTRIES, INC.

Wayne, Michigan . Richmond, California

Plants in Wayne and Ypsilanti, Mich.; Findlay Ohio; Mattoon, III.; Richmond, Calif.



Gar Wood



Ger Wood



Gar Wood-Buckeye



Gar Wood-Buckeye



Gar Wood Tractor Equipment



Gar Wood

. . for more details circle 211, page 16

B.F. Goodrich



Sandy soil and 24-ton loads—here's a job for new BFG Special Earth Mover tires

That giant scraper is hauling 24 tons of sand fill for troop barracks at Fort Ord, California. Plowing through sandy soil under this payload, plus the weight of the equipment, would cause most tires to bog down and become useless. That's why this contractor uses these giant B. F. Goodrich 65" Special Earth Mover

tires with all-nylon cord construction.

Special Earth Mover tires operate at low air pressures. They conform to the soil, rolling over it rather than digging into it. And to stand the strain of this flexing, B. F. Goodrich builds the Special Earth Mover tire with an *all-nylon* cord body.

Nylon withstands double the im-

pact of ordinary cord materials, resists heat blowouts and flex breaks. That's why B. F. Goodrich builds *all* of its off-the-road tires with an *all-nylon* body, why they can be recapped over and over!

Your B. F. Goodrich retailer has a longer-wearing, money-saving tire for every type of off-the-road work. See him today or write B. F. Goodrich Tire & Equipment Co., A Division of The B. F. Goodrich Co., Akron 18, Ohio.

Specify B. F. Goodrich tires when ordering new equipment



Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book

There's a B. F. Goodrich tire for every construction job



. . for more details circle 213, page 16

ROADS AND STREETS, July, 1956

WHAT'S NEW in Equipment and Materials

Auger Attachment for Hydrocrane

A new auger attachment for use on the Model H-3 and H-5 Hydro-cranes, anounced by Bucyrus-Erie Co., South Milwaukee, Wis., consists of the cutter head, 4-ft. auger flight sections, a hydraulic motor and gear box, a torque arm extending from motor bracket to boom, and drain hose.

According to the manufacturer, the new unit drills holes up to 28-in. in diameter. Maximum depth capacity is 40 ft.

Both vertical and horizontal boring jobs can be done with the new device.

Auger diameters range in size from 3-in. to 28-in. The cutter heads are fitted with long-wearing, sharp, carboloy teeth, and specially designed heads for drilling various types of materials are available.

> For more information circle 101 on Service Coupon this page and mail now.

System for Keeping Wire Rope Service Records

A new and simple plan for keeping wire rope service records has been announced by Leschen Wire Rope Division, H. K. Porter Co., Inc. The plan is useful to every user of wire rope — and so easy to put into operation that practically no extra time and effort are required. It is a fact-finding system designed to increase wire rope operating efficiency and to help reduce supply and maintenance costs by furnishing com-

parative data on wire rope types, construction and makes.

The basic element of the service-score system is a sticker which closely resembles the sticker applied to an automobile to record oil changes. It is applied directly to the wire rope using equipment by means of a pressure-sensitive adhesive that permits easy removal. It withstands weathering and may be written on with pencil, pen or ball point. Service-score stickers come in strips of four backed by waxed paper to protect the adhesive. They are easily applied by finger pressure.

For a starting supply of service-score stickers, write Leschen Wire Rope Division, St. Louis 12, Mo.

For more information circle 102 on Service Coupon this page and mail now.

Temporary Traffic Line Paint

A new removable type paint, "Temline," that can be used during emergencies and can be completely removed after the emergency is past, has been placed on the market by Traffic Safety Supply Co., 2636 N.E. Sandy Blvd., Portland 12, Ore.

Removable Temline for temporary conditions is applied like ordinary paint to mark or delineate semi-permanent lines that will last as needed up to 5 months. No special equipment is needed and may be sprayed or brushed.

The paint is completely removable by using R-14 remover. Temline is available in three colors: white, yellow and neu-

tral gray; white or yellow (choice) for new lines, and neutral gray to cover existing permanent lines. The paint dries in 15 minutes or less and removal operation takes about 15 minutes. With this flexibility changing lines for traffic lanes, storage warehouse space, safety lines and pedestrian control is made simple. Temline is unaffected by water and may be scrubbed. R-14 remover dissolves only Temline paint, and original lines temporarily covered by it will be restored after the emergency is past.

For more information circle 103 on Service Coupon this page and mail now.

Diesel-Powered Lift Trucks

Diesel engines are now offered as original equipment on certain lift trucks manufactured by Hyster Co., 2902 N.E. Clackamas St., Portland 8, Ore. Available for Hyster lift trucks of 6,000 and 8,000 lb. capacity is the Perkins P4 (4 cylinder) diesel unit. Hyster 15,000, 16,000, 18,000 and 20,000 lb. capacity lift trucks can be factory equipped with the Perkins P6 (6 cylinder) model.

Waukesha model 180 DLC 4 cylinder engines are offered installed on Hyster's solid-cushioned-tire 3,000, 4,000 and 5,000 lb. capacity lift trucks.

For more information circle 104 on Service Coupon this page and mail now.

More equipment news page 123

Heavy Duty Hydraulic Torque Converters

Availability of its full line of heavy duty hydraulic torque converters for use on excavating, earth-handling, and construction machinery has been announced by National Supply Co., 2 Gateway Center, Pittsburgh, Pa. A new sales unit has been set up within the company to handle torque converters and other of the company's industrial products.

Until recently limited to use on oil field machinery and equipment, National single-stage torque converters are now being manufactured in a range of 100 to 1000 hp. This has been accomplished with six basic sizes which includes 17 power capacities in closely spaced ranges for exact matching with engines and electric motors. These power ranges are provided by modification of the converter hydraulic circuit.

Entry into other industrial fields was prompted by outstanding performance and trouble-free operation in the extremely heavy duty service required of oil well drilling rigs.

For more information circle 105 on Service Coupon this page and mail now.

For more items see page 123

MAIL THIS COUPON TODAY!

hicago	10, 111										AND	MAIL N	HOWI
		Ple	ntioned	d me fu	rther in	formatic Roads	& Street	roducts ets as	and me	below			
About N	law Equi	ipment	and Lite	erature:				101	102	103	104	105	106
107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134
135	136	137	138	139	140	141	142	143	144	145	146	147	148
149	150	151	152	153	154	155	156	157	158	159	160	161	162
163	164	165	166	167	168	169	170	171	172	173	174	175	176
Further	Informat	ion on	Advert	ised Pr	oducts:			177	178	179	180	181	182
183	184	185	186	187	188	189	190	191	192	193	194	195	196
197	198	199	200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232	233	234	235	236	237	238
239	240	241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264	265	266
267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294
295	296	297	298	299	300	301	302	303	304	305	306	307	308
309	310	311	312	313	314	315	316	317	318	319	320	321	322
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How to beat a fleet of limited-duty rigs

International Drott 4-IN-1



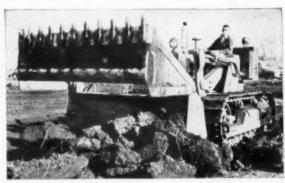
Beat a power shovel wherever exclusive Drott triple-power, prv-action break-out is decisive—and where quick International crawler mobility can outspeed and "out-reach" a boom. Break-out force of the three Four-In-One models as Skid-Shovels ranges from 12,800 to 55,000 lbs.



Gain a 30-inch (or greater) dumping height advantage over ordinary roll-forward bucket dumping—by using the bottom-dump feature of the Four-In-One as a clamshell. And loading with the clamshell action, get a super-fast bucket-fill on stockpiled materials, even in cramped quarters.



Get versatile carry-type scraper action with the Four-In-One in Bullclam position. Using positive clam lip control, spread materials, strip, and grade with amazing accuracy. And as a Bullclam, the Four-In-One heap-loads itself with speedy, earth-boiling action!



Get big dozing capacity with finger-tip ease with your Four-In-One in bulldozer position. Regulate dozing depth by hydraulic "radius control" of blade pitch. Note the frost-breaking, earth-moving action. Shown here is new 2½-yard Four-In-One for the International TD-14.



Prove Four-In-One versatility unlimited with the 1-yard TD-6, the 1½-yard TD-9, or the new 2¼-yard TD-14 model. Test exclusive pry-over-shoe break-out action, and exclusive shock-swallowing Hydro-Spring. Ask your International Drott distributor for a Four-In-One demonstration.



International Harvester Company, Chicago 1, Illinois

INTERNATIONAL.

DROTT

. . . for more details circle 222, page 16

Important reasons why it pays to use

True Original
Parts

Allis-Chalmers True Original Parts start right. Each benefits from one of industry's most intensive metallurgical research programs. And each is designed by experienced construction machinery engineers to do a specific job . . . with ample capacity to carry a full share of the work load just as the new equipment part did.







PRECISION-MADE

Skilled craftsmen bring True Original Parts to life—working with the most modern manufacturing equipment and meeting the highest industrial standards. The result: precision-made parts get full work power from your Allis-Chalmers machinery.

CAREFULLY INSPECTED

True Original Parts go through rigid original-equipment inspection and testing processes to assure long-life service. For example, gears are checked again and again for perfect meshing... for true balance... for full capacity.

PROPERLY PACKAGED

You want your parts factory-new ..., and that's how you get True Original Parts. Many are specially treated ... then sealed and packaged against rust, dust and damage.

A country-wide network of dealers stock ample supplies of True Original Parts. Whether you're working in one area or across the country, you can depend on reliable parts service close to your job from your Allis-Chalmers Construction Machinery dealer.

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS



. . . for more details circle 178, page 16

ROADS AND STREETS, July, 1956

ROADS AND STREETS

Sixty-Four Years of Editorial Leadership

Washington News Letter



By Duane L. Cronk

July 10, 1956

Well, it happened! Our new highway program, compromise version, after being ironed out in a joint conference of Senators and Congressmen and okayed by both houses, has been signed into law by President Eisenhower. This launches, at long last, a road effort that will be the greatest non-military construction undertaking in world history, an effort designed to make America's highways fast enough and safe enough by 1969 for the movement of 80 million vehicles.

The bill the conferees drafted was welded together from testimony given in months of Congressional investigation, from the give-and-take of dozens of committee meetings, and hours of debate on both the Senate and House floors. For highway men in Washington, the long-range scheme represents the climax of years of patient but persistent urging. The new National Highway Program bears the imprint of the best thinking of, not only the Congress, but the organized groups representing highway interests - state highway officials, municipal leaders, motorists, truckers, contractors, and others.

Here are its highlights, money-wise:

- The federal government will contribute \$32.5 billion in federal-aid to the states for road construction over the next 13 years. Coupled with state matching money, these funds will spark a \$50-billion federal-aid program. This is in addition to what the states, counties, and cities will expend themselves perhaps another \$50 billion.
- ullet 0f the federal contribution, \$25 billion will be earmarked for completion of the National Interstate System, on a 90-10 matching basis. During the 13-year period, these funds will run from about \$1.2 billion a year to \$2.2 billion.
- Federal-aid for the regular primary, secondary and urban systems will be boosted from \$700 million this year to \$825 million in '57, to \$850 million in '58, and to \$875 million in '59. The traditional 50-50 matching basis will apply.

* * *

Interstate System funds will be apportioned to the states for the first three years on the existing formula (2/3 population. 1/6 area, 1/6 rural road mileage). In the meantime, the Bureau and the state departments will make a detailed estimate of the cost to finish the System to uniform standards. This estimate will be the basis for apportionments for the second three years. Still another estimate will be made and accepted as the basis for the following four years. Thereafter, estimates will be made annually.

(continued on next page)

In a move to expedite work on the Interstate System, the conferees included a provision permitting the state highway departments to contract beyond their annual apportionments for the first three years of the program, and claim reimbursement in later years.

Contractors will have to pay the "area prevailing" wage on Interstate jobs, as determined by the federal government. However, in determining the rates, the Secretary of Labor must consult the highway officials involved and give "due regard to the information thus obtained." And he must make a pre-determination of minimum wages in time for them to be included in the advertisement for bids.

For the first time in highway legislation, the federal government moves into the field of vehicle size and weight regulations. The conferees agreed to aclause limiting the weight of trucks using the Interstate System to 18,000 lb. per single axle, 32,000 lb. per tandem axle, or a gross over-all weight of 73,280 lb. Width will be held to 96 inches. However, existing state laws which permit greater sizes and weights will prevail.

* * *

To speed up right-of-way acquisition for Interstate jobs, the federal government is authorized, on request of the state, to take possession in its behalf. Funds may be used for right-of-way purchase on the same 90-10 matching basis as construction. If a state does not have adequate control of access laws to safeguard the design standards of the System, the federal government may hold the outside 5 ft. of any right-of-way so acquired.

Uncle Sam will advance funds for right-of-way purchase, also, for projects on any of the federal-aid systems, if the job is scheduled to get under way within the next five years.

Other important provisions. . . The mileage of the Interstate System has been boosted from 40,000 to 41,000 miles ... States which have built toll roads to Interstate System standards will be reimbursed, after a study by the BPR determines what the cost will be ... Whenever a state pays for cost of relocating utilities, federal funds may be used in the same ratio as expended for construction.

The Department of Commerce will investigate the appalling rate of traffic deaths on the highways and recommend what role the federal government should adopt in accident prevention. The \$200,000 study may determine if there is a need for the federal government to help enforce traffic laws, promote uniform traffic laws, regulate design of automobiles or sponsor educational campaigns.

* * *

The ambitious federal-aid program will be financed out of a Highway Trust Fund, into which will go a number of new or increased highway user taxes providing \$14.8 billion in new revenue over the next 16 years. Among them: Increase in the federal gasoline and diesel fuel tax from 2¢ to 3¢; increase in excise tax on trucks, truck trailers and buses from 8% to 10%; in the excise tax on tires from 5¢ to 8¢ per 1b.; a new tax of 3¢ per 1b. on retread rubber; and a new use tax of \$1.50 per 1,000 lb. on trucks and buses weighing more than 26,000 lb. Fuel used in contractors' off-highway machinery will not be subject to the tax increases.

Apportionment of Federal-Aid Funds, by Systems, to the States for:

(1) 1957 - the first year of the program - effective July 1. (2) 1957 through 1959 - the first three years of the program.

(These figures include funds previously authorized under the 1954 Act)

(By millions)

New Hampshire	Nebraska	Montana	Missouri	Mississippi	Minnesota	Michigan	Massachusetts	Maryland	Maine	Louisiana	Kentucky	Kansas	Iowa	Indiana	Illinois	Idaho	Georgia	Florida	Delaware	Connecticut	Colorado	California	Arkansas	Arizona	Alabama	State
1.9	7.2	7.4	10.8	6.6	9.8	11.7	4.7	3.3	3.2	5.8	6.9	8.9	9.0	8.8	14.4	4.6	9.2	6.0	1.9	2.4	6.7	17.1	6.2	5.5	7.9	9r 1 Sys 1957
5.8	22.5	23.0	33.1	20.2	29.7	36.0	14.9	10.4	9.7	18.0	21.3	27.2	27.5	27.1	44.6	14.0	28.1	18.5	5.8	7.5	20.9	53.0	19.0	16.8	24.1	Primary System)57 1957-59
3.2	5.1	5.1	7.3	5.5	6.9	7.1	1.8	2.0	2.2	4.2	5.8	6.3	6.6	6.1	7.8	3.2	7.0	4.0	1.2	1.2	4.5	8.8	5.0	3.8	6.1	Seco Sys 1957
3.8	15.9	15.9	22.3	16.9	20.9	21.9	5.6	6.3	6.8	13.1	17.8	19.1	20.2	18.7	24.2	9.9	21.6	12.1	3.8	3.8	13.9	27.1	15.4	11.5	18.7	Secondary System 1957 1957-59
0.6	1.2	.5	5.1	1.2	<u>س</u> س	9.6	8.5	3.4	. 80	3.0	2.1	1.9	2.5	4.9	14.3	.4	2.9	3.7	.5	4.0	1.8	18.2	1.2	. 8	2.7	Urban System 1957 1957-
1.9	3.8	1.5	15.8	3.6	10.4	29.8	26.6	10.7	2.6	9.3	6.6	6.0	7.6	15.3	44.7	1.2	9.2	11.5	1.4	12.4	5.4	56.8	3.6	2.5	8.4	1957-59
8.2 3.7	13.5	13.0	23.2	13.3	20.0	28.4	15.0	8.7	6.2	13.0	14.8	17.1	18.1	19.8	36.5	8.2	19.1	13.7	3.6	7.6	13.0	44.1	12.4	10.1	16.7	Sub 1957
24.9	42.2	40.4	71.2	40.7	61.0	87.7	47.1	27.4	19.1	40.4	45.7	52.3	55:3	61.1	113.5	25.1	58.9	42.1	11.0	23.7	40.2	136.9	38.0	30.8	51.2	Sub-Total 957 1957-59
12.2	16.7.	16.8	31.8	18.7	26.5	42.2	25.0	14.0	9.4	19.3	22.0	21.3	23.9	28.5	55.2	11.8	27.4	19.9	7.4	11.3	16.0	66.8	17.0	13.5	23.8	Inte Sy 1957
30.5	69.8	69.9	132.0	77.4	109.9	175.2	104.0	58.4	39.2	80.4	91.4	88.5	99.4	118.5	229.7	49.2	113.6	82.8	30.5	47.0	66.5	277.8	70.8	55.9	98.9	Interstate System 957 1957-59
20.4	30.2	29.8	55.0	32.0	46.5	70.6	40.0	22.7	15.6	32.3	36.8	38.4	42.0	48.3	91.7	20.0	46.5	33.6	11.0	18.9	29.0	110.9	29.4	23.6	40.5	A11 1957
75.8	112.0	110.3	203.2	118.1	170.9	262.9	151.1	85.8	58.3	120.8	137.1	140.8	154.7	179.6	343.2	74.3	172.5	124.9	41.5	70.7	106.7	414.7	108.8	86.7	150.1	Total Systems 1957-59

(turn page for continuation)

THE NATIONAL HIGHWAY PROGRAM

(Continued from Previous Page)

	State 1957 19	New Jersey 4.9	Mexico		North Carolina 9.3	North Dakota 5.4		homa	Oregon 6.3	lvania		na			Tennessee 8.1		Ssee	n Dakota essee s	n Dakota essee s ont inia	n Dakota essee s ont inia ington	n Dakota essee s ont inia ington Virginia	n Dakota essee s ont inia ington Virginia onsin	n Dakota essee s ont inia ington Virginia onsin	n Dakota essee s ont inia ington Virginia onsin ing	essee s ont inia ington Virginia onsin ing	essee s ont inia ington Virginia onsin ing
Primary	57-59	15.2	18.3	54.8	28.6	16.4	40.3	24.4	19.3	46.3	5.8	16 /	13.4	17.4	17.4	17.4 17.4 24.9 74.1	17.4 17.4 24.9 74.1 13.0	17.4 17.4 24.9 74.1 13.0	17.4 17.4 24.9 74.1 13.0 5.8	17.4 24.9 74.1 13.0 13.0 19.0	17.4 24.9 74.1 13.0 13.0 12.6	17.4 24.9 74.1 13.0 5.8 22.1 19.0 12.6	17.4 24.9 74.1 13.0 5.8 22.1 19.0 12.6	17.4 24.9 74.1 13.0 13.0 12.6 119.0 114.3	17.4 24.9 74.1 13.0 13.0 12.6 112.6 114.3	17.4 24.9 74.1 13.0 5.8 22.1 12.6 112.6 5.8 5.8
Seco	1957	1.7	4.1	7.1	7.9	4.0	7.9	5.7	4.5	8.8	1.2	4.2		4.2	6.2	4.2 .6.2 16.2	4.2 .6.2 16.2	4.2 16.2 2.8	4.2 6.2 16.2 2.8 1.2	4.2 16.2 2.8 1.2 5.5	16.2 16.2 2.8 1.2 3.5	4.2 16.2 2.8 2.8 4.1 3.5	16.2 2.5 3.5 4.5 2.8 3.5 4.5 3.5 4.5 3.5	1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2	1.2 2.5 1.2 2.5 1.2 2.5 1.2 2.5 1.2 2.5 1.2 2.5 1.2 2.5 1.2 2.5 3.5 1.2 3.5 1.2 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5 3.5	16.2 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2
Secondary	1957-59	5.2	12.6	22.0	24.5	11.9	24.5	17.5	13.6	27.6	3.8	12.8	12.5		19.4	19.4	19.4	19.4 49.7 8.7 3.8	19.4 49.7 8.7 3.8 17.1	19.4 49.7 8.7 3.8 17.1	19.4 49.7 8.7 3.8 17.1 12.7	19.4 49.7 8.7 3.8 17.1 12.7 11.0	19.4 49.7 8.7 3.8 17.1 12.7 11.0 18.8 9.8	19.4 49.7 8.7 3.8 17.1 12.7 11.0 18.8 9.8	19.4 49.7 3.8 17.1 12.7 11.0 18.8 9.8 3.8	19.4 49.7 8.7 3.8 17.1 12.7 11.0 18.8 9.8 3.8
VC PT	1957	9.0	.7	27.4	2.6	.4	11.8	2.2	1.6	15.5	1.4	1.4	.4	0	6.3	9.0			w	3	1.2.2.000	4.0	. 4.1.3	41133 9	1	1.887.2088
Urban System	1957-59	28.0	2.1	85.4	8.2	1.2	36.9	6.9	5.1	48.4	4.5	4.4	1.2	9.2	30.6		2.6	2.6	9.9	2.6 9.9	2.6 9.9 9.6	2.6 9.9 9.6 4.1	2.6	2.6 12.5 2.6 2.6	12.5 12.5 5.16 5.16	5.5.1 2.5.5 2.5.6 5.6 5.6 5.6 6 6 6 6 6 6 6 7 7 8 7 8 8 8 8 8 8 8 8
Sub	1957	15.6	10.8	52.1	19.8	9.8	32.7	15.9	12.4	39.0	4.5	10.7	10.4	17.2	50.2	7.8	3.4		15.8	13.3	15.8 13.3 8.9	15.8 13.3 8.9	15.8 13.3 8.9 8.0	15.8 18.9 3.8	15.8	13.3 8.9 18.9 4.9 5.7
Sub-Total	1957-59	48.4	33.0	162.2	61.3	29.5	101.7	48.8	38.0	122.3	14.1	32.6	31.1	53.5	100	134.4	24.3	24.3	24.3 10.5 49.1	10.5 10.5 49.1 41.3	154.4 24.3 10.5 49.1 41.3 27.7	154.4 24.3 10.5 49.1 41.3 27.7 58.3	154.4 24.3 10.5 49.1 41.3 27.7 28.3 24.7	154.4 24.3 10.5 49.1 41.3 27.7 58.3 24.7	24.3 10.5 49.1 41.3 27.7 58.3 24.7 11.7	154.4 10.5 49.1 41.3 27.7 58.3 24.7 11.7
Inte	1957	25.7	14.2	83.1	29.9	13.0	50.2	21.0	15.9	62.8	7.4	15.7	13.6	25.1	67.4	11.4	7.4	23.7		18.9	14.0	14.0	18.9 14.0 26.7 12.1	18.9 14.0 26.7 12.1	18.9 14.0 26.7 12.1	18.9 14.0 26.7 12.1
Interstate	1957-59	106.7	59.1	345.4	124.2	54.0	208.6	87.2	66.2	261.1	30.5	65.5	56.5	104.3	280.0	47.5	30.5	98.6	78.3	59 1	TOOL	110.9	110.9	50.6	110.9 50.6	30.5
11A	1957	41.3	25.0	135.2	49.7	22.8	82.9	36.9	28.3	101.8	11.9	26.4	24.0	42.3	117.6	19.2	10.8	39.5	32.2	22.9	45.6	20.1	20	6.0	12.3	12.3
Total Systems	1957-59	155.1	92.1	507.6	185.5	83.5	310.3	136.0	104.2	383.4	44.6	98.1	87.6	157.8	434.4	71.8	41.0	147.7	119.6	95.8	169.2	75.3	11 7	LLas	45.7	45.7

[•] In addition to the matching funds authorized above, Congress approved \$103 million per year in both 1958 and 1959 for forest highways, forest development roads, national park roads, parkways and roads through Indian lands and public lands.

[·] Federal aid for Alaska was authorized for the first time on a continuing basis, as in other states.

[·] State highway departments may transfer up to 20% of the funds in any one system to another.

OPERATORS APPRECIATE

They can do more and better work

with less physical effort. There is no

gear shift mechanism — no master

When the governor lever is moved to

a selected rolling speed, the engine

power is applied and regulated

clutch to operate.

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• Torque Converter Drive. No gear shifting, no master clutch.

- Velvet-smooth travel reverse at the
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- Rolling speeds .8 to 5.5 mph.
- drive combines gradual gear reduction, low ratios, anti-friction bearings, and alloy steel gears to assure constant alignment, less wear and maintenance.
- Hydraulic steering.



THE GALION IRON WORKS & MFG. CO., General and Export Offices, Galion, Ohio, U.S.A. Cable address: GALIONIRON, Galion, Ohio

for more details circle 209, page 16

ROADS AND STREETS, July, 1956



"Little Wizard"— provides steady wind-defying red light—up to 30 hours of it. Burns bright, stays bright to the last drop!



"750" Torch— up to 40 hours of clear, bright flame—highly visible near or far. Leaktight, rough and tough.

Nothing else on your projects is more important—to you—than proper warning lights. Your reputation, your position, (and your insurance rates) are at stake every time the public passes a project. One serious accident due to inadequate safety lighting, and BAM!—trouble starts.

Dietz Provides the Best Protection

Use *Dietz* Warning Lights. Longburning and unfailingly reliable. Nothing to "wear out" or fail at a vital moment. Choose exactly what you need from the most complete line of kerosene torches and lanterns available.

• Be sure. Take a hard look at your warning lights. Are they really adequate? Your Dietz distributor can help you find out. R. E. Dietz Co., 102 Leavenworth Ave., Syracuse 1, N. Y.

LOOK TO FOR Safety LIGHTING
... for more details circle 203, page 16

Truckers encouraged by Indiana toll officials

A four-point program is announced for encouraging truck and commercial traffic on the Northern Indiana Toll Road, when it is opened late this summer. The program was adopted following recent meetings conducted by the Indiana Toll Road Commission in Indianapolis, Chicago and Akron. Suggestions made by trucking industry representatives and authorized formally by the commission were:

 Establishment of a charge-account system for commercial users of the road.

Issuance of so-called "single trip" tickets on credit to trucking companies which haul cargo on a trip-by-trip basis.

3. Free access to the toll road and turn-around privileges for truck company safety patrols, with proper sanction of and supervision by the Indiana State Police.

4. Permission with approval by the State Police for truck companies to tow in their own vehicles stalled on the road by mechanical break-down or accident. Ordinarily all major mechanical breakdowns or wrecks will be serviced by wrecking crews from communities along the toll road route.

Dr. Dillon Geiger, Commission chairman, said that several other suggestions received in the meetings with the trucking industry representatives are being studied by the Commission and that future action on them may be expected.

Electronic computing subject of conference

The Louisiana department of highways, according to Dr. F. J. Germano, head of Civil Engineering Department, L. S. U., has shown that earthwork quantity figures for highway construction can be obtained from field notes seven times as fast by electronic computers as by conventional methods.

The uses of the electronic computer for automation of highway engineering computations were discussed in a recent conference held on the L. S. U. campus and sponsored by the Louisiana State University Department of Civil Engineering and College of Commerce, and Louisiana department of highways.

The meeting, attended by engineers, professors and accountants from four-teen states in the East, Midwest, West, and South, covered methods of converting rod readings to actual elevations.

The Problem Move 16,000,000 Yards of Rock, Marine Clay, Boulders and Heavy Earth



again the answer was..... Firestone NYLON TIRES

In excavating the marine channel on Galop Island in the St. Lawrence Seaway, millions of yards of heavy boulder-strewn glacial till are being moved under the toughest haul road conditions.

The Galop Island project is well on its way and as on other Seaway jobs, Firestone nylon tires is the answer because they are tougher tires. They cut big downtime losses, give more retreads and keep tire costs at a minimum.

Firestone nylon tires are built for severe service. The

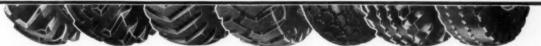
treads give maximum traction and they are extra tough to resist cutting. Double-thick sidewalls give added protection against cuts and snags.

Firestone's Safety-Tensioned Gum-Dipped nylon cord body gives greatest protection against impact breaks . . . flex breaks . . . heat failures . . . and water damage.

Let your Firestone Dealer or Store show you how Firestone nylon tires will cut downtime and increase the profits on your job.



A TIRE FOR EVERY ROAD, LOAD AND CONDITION OF SERVICE



GROUND GRIP GG WIDE BASE ROCK GRIP RG WIDE BASE ALL NON-SKID ALL TRACTION RIB EXCAVATOR

WHEN YOU BUY NEW EQUIPMENT OR REPLACEMENT TIRES, SPECIFY FIRESTONE

Enjoy the Voice of Firestone on radio or television every Monday evening over ABC

, for more details circle 205, page 16

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PAYLOADER model HO



more yards per load

Gets More

A combination of powerful "pry-out" action using breakout pads as a ful-crum for leverage and a 40° bucket tip-back at ground level gets BIGGER LOADS with less spillage.

Keeps More

Heaped loads are cradled closer and lower for greater stability while carrying. Hydraulic system shock-absorber also cushions the load, smooths the ride, and permits faster movement with less spillage.

Delivers More

Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result—you deliver more yards per load and more loads per hour.

The new model HO is the finest four-wheel-drive tractor-shovel ever offered. It has everything that has proven desirable in modern tractor-shovel design, including important new and exclusive features: torque-proportioning differentials; no-stop power-shift transmission; powerful 40-degree bucket break-out action; "stay-clean" hydraulic system; greater dumping height and reach; longer wheelbase; shorter length while carrying.

This big "PAYLOADER" operates easier and faster and rides smoother, with or without a load, than anything near its size. It has balanced design and durability throughout to turn out big production day after day. If you want proof of its productive capacity and superior performance, ask your "PAYLOADER" Distributor for a demonstration.



more loads per hour

Loaded with "more-yardage" features

- Torque proportioning differentials an exclusive "PAY-LOADER" feature—increase effective traction. If one wheel begins to spin because of poor traction, more power is delivered automatically to the other wheel.
- "No-stop" power-shift transmission, with torque-converter, can make ALL shifts on-the-go under full engine speed. There's no stopping for a range shift and no "clutching". Operator can "inch" the machine with forward-reverse control while maintaining full engine speed to provide maximum bucket lifting and dumping power.
- All-power control also includes power brakes on all wheels, and power steer to further reduce operational fatigue and promote full production all day.
- Rugged planetary final drives in all wheels, plus hypoid differential gearing keep torque low in axles—prolong life of drive train parts as well as axles.



Safety and Stability

The safest and most stable wheeled tractorshovel ever built. Moving members cannot injure operator because of underslung boom arm design and positioning. With loads carried lower and closer to the machine, cushioned during travel, and with longer wheel-base the utmost in stability is achieved.

T 88 E	EDA	N 14	HOUGH	-

768 Sunnyside Ave., Libertyville, Ill.

Send information on "PAYLOADER" tractor-shovels:

- model HO
- model HH
 - 1% cu. yd. heaped,
- medel HU
 - 214 cu. yd. heaped, 134 cu. yd. struck
- 1% cu. y
 - 11/3 cu. yd. struck
- 1 cu. yd. heaped, 34 cu. yd. struck

Name

Title.

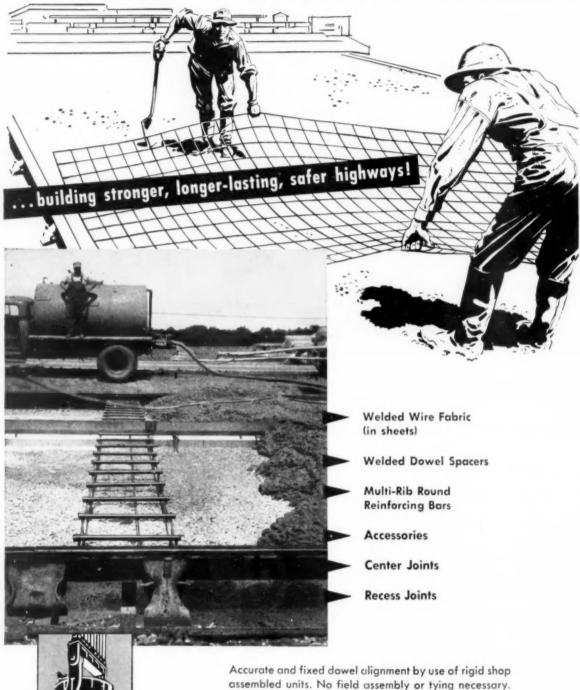
Company

Street_

State

. . . for more details circle 219, page 16

LACLEDE HIGHWAY STEELS



assembled units. No field assembly or tying necessary.



STEEL COMPANY

SAINT LOUIS, MISSOURI

Producers of Steel for Industry and Construction

. . for more details circle 227, page 16

ROADS AND STREETS, July, 1956

Set your sights on an Allis-Chalmers HD-6G



"ALLIS-CHALMERS HAS A GREAT TRACTOR HERE... we like our HD-6G for its low cost, big output, easy transport and simple operation"

Joe Brown, Ratliff City, Oklahoma

Working on all kinds of jobs, large and small . . . keeping 9 trucks and 5 Allis-Chalmers tractor shovels busy, that's the Joe Brown Company. Read what owner Joe Brown says about his new Allis-Chalmers 1 1/2-yd HD-6G:

"Working with two trucks on a recent road job, our 6G moved 700 yards of big rock in one day. In dirt it does even better. The tracks are heavy and long, and power is well coordinated with the bucket. All this means real economy to us; we're profiting with the 6G."

Kenneth Chromieter, HD-6G operator, says: "I like the visibility; and the engine is terrific." And speaking of bucket capacity and strength, Chromieter added, "You know, we had rocks in this bucket they wouldn't let me dump on

the trucks. It sure can do the job."

Yes, the HD-6G "sure can do the job." Stories like this from owners and operators are coming in from all over the country to prove it.

Let your Allis-Chalmers construction machinery dealer demonstrate the 6G for you . . . show you all the exclusive advantages that will help you get top performance and big production on your jobs.

HD-6G

11/2-yd bucket 55 belt hp 19,600 lb

ROADS AND STREETS, July, 1956

, for more details circle 179, page 16

ALLIS-CHALMERS, CONSTRUCTION MACHINERY DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALM





It's BEST to INVEST in UNIT...

because UNIT's advanced design gives you Self-Aligning, Replaceable Hook Shoes ... Straight-in-line Engine Mounting with Torque Converter ... Hydraulic Actuated Clutches ... Modern Transmission with Involute Splines ... One Piece Cast Gear Case ... Alloy Steels and Forgings ... Force Feed Lubrication and many other UNIT advantages. These life-prolonging features are contributing substantially to the performance and efficiency of each machine. And they explain why UNIT equipment is so universally acceptable.

See the many other new features illustrated and described in UNIT CHALLENGER Bulletin C-800. Write for your copy of this bulletin.



. . for more details circle 257, page 1

Contractor's work orders

A great deal of time is now being lost by the average contractor while he is awaiting approval of work or-ders on his job. We have discussed this matter at length both with the highway department and the district engineer for the Bureau of Public Roads. Where such changes cover increases in unit prices, the time lapse will be materially shortened if the work order can be sent in with a breakdown as to the way in which the price was calculated. Where this isn't done, it is necessary that the department engineers make such figures of their own and this invariably delays the approval of the work order.

Under a new procedure just now being tried out, the smaller work order approvals are being handled by telephone between the district office and Richmond, and, in turn, between the department and the Bureau of Public Roads. The field forces of the department have been asked to coperate in the eliminating delays as far as they can. Your help with these breakdown figures will help reduce the unnecessary expense of delays.

Bulletin from Virginia Road
 Builders Association to
 member contractors.

Traffic moving faster

The average speeds of motor vehicles on main rural highways where drivers were free to choose a desired speed set an all-time record in 1955, according to the Bureau of Public Roads. The new high of 50.7 mph for all vehicles is 0.7 mph above the 1954 figure. Cooperative studies by 33 states indicate that the average 1955 speeds for passenger cars, trucks, and buses were 52.1, 45.8, and 52.6 mph, respectively.

Fifty-seven per cent of the passenger cars exceeded 50 mph and 18% were traveling over 60 mph. Twenty-seven per cent of the trucks and 63% of the buses exceeded 50. The greatest increase was recorded in the central and western area where 16 of the 17 states reporting both in 1954 and 1955 experienced an increase in speeds. In the east, all classes of vehicles show a slight decrease in speed.

During 1947, after all wartime restrictions on motor vehicle fuel and tire rationing were lifted, the average speed for all vehicles was 46.8 mph with passenger cars averaging 47.8, buses 47.4, and trucks 42.2.

All of these results are based on studies conducted on straight, level sections of highways during light traffic when most drivers can travel at their desired speeds.

Advanced hydraulics boost production



EXCLUSIVE LIVE HYDRAULIC WHEEL HOIST positions digging wheel faster, more accurately and independent of all other operations. Instantly operated from seat by simple, one-hand controls.

EXCLUSIVE HYDRAULIC CONVEYOR DRIVE provides three discharge speeds in either direction . . . instant adjustment to handle any volume of spoil independent of any other function. No complicated shifting, no need to stop digging wheel or crawlers. Completely controllable from the seat.

These and other Buckeye features mean smooth, clean, low-cost ditching... more ditch per dollar with the greatest return on your capital investment. They also mean longer life, less maintenance and less downtime.

Find out more about these advanced Buckeye models: the 305, 307 and 308. See your Gar Wood-Buckeye dealer, or write to: Customer Service Department, Gar Wood Industries, Inc., Wayne, Michigan.

MORE FOR YOUR MONEY!

TRACTOR-TYPE CRAWLERS give long, trouble-free service life . . . simplify variation in tread width and bearing areas through a selection of pads for any

SIMPLIFIED GROUP CONTROLS, with panelmounted conveyor and hoist controls, footoperated steering controls. Control arrangement helps operator adjust to changing digging conditions faster, easier

UNIT CONSTRUCTION provides interchangeability of major components and assem-blies of all three new models.

TAPERED ROOTER BITS fit inside holders. are pitched for proper bit angle and bucket heel clearance. Last longer . . . can be replaced easier and at a much lower cost

GAR WOOD INDUSTRIES, INC.

Wayne, Michigan . Findlay, Ohio

Plants in Wayne and Ypsilanti, Mich.; Findlay, Ohio; Mattoon, Ill.; Richmond, Calif.

















Gar Wood-Buckeye **Finegraders**

for more details circle 210, page 16

here . . . without a doubt . . . is the most useful buying catalog in your office

... and here are some reasons why you should be USING IT DAILY!

- Catalogs are PREFILED Saving you time and space required to file individual manufacturers' catalogs.
- Saves you the time and inconvenience of writing to manufacturers for catalogs.
- Gives you all the facts needed BEFORE you make a buying decision.
- Manufacturers' names and trade names indexed alphabetically for quick reference to individual catalogs.
- All the buying information is 'boiled down' — designed for your convenience.

After checking the advantages listed above, you can see why this ONE CATALOG offers you so MANY advantages ... saving you both time and money, not only in the mechanical and physical aspects of a cataloging operation ... BUT MOST IMPORTANT OF ALL ... it is available WHEN you NEED it ... BEFORE you make your buying decisions! The manufacturers represented in this catalog are literally 'meeting' with you in your office — offering you all the information you could possibly need concerning their products. Why not meet them at least half way — and USE THEIR PREFILED INFORMATION!



Here are the manufacturers represented in Gillette's Heavy Construction Prefiled Catalog:

American Steel & Wire Div. **Anthony Company** Armco Drainage & Metal Products, Inc. Arrow Manufacturing Company Austin-Western Company **Baldwin-Lima-Hamilton** Corporation Barber-Greene Company Blaw-Knex Company **Brisco Manufacturers of** Calif. Bros Boiler & Mfg. Co., Wm. Buffalo-Springfield Roller Co. **Butler Bin Company** Carey Manufacturing Co., Philip

American-Marietta Company

Chrysler Corporation,
Industrial Engine Div.
Clark Equipment Company
Cleaver-Brooks Company
Cleveland Form Grader Co., The
Cleveland Trencher Co., The
Colorado Fuel & Iron Corp., The
Continental Motors Corporation
Cummer & Son Co., The F. D.
Cummins Engine Co., Inc.
Detroit Diesel Engine Div.

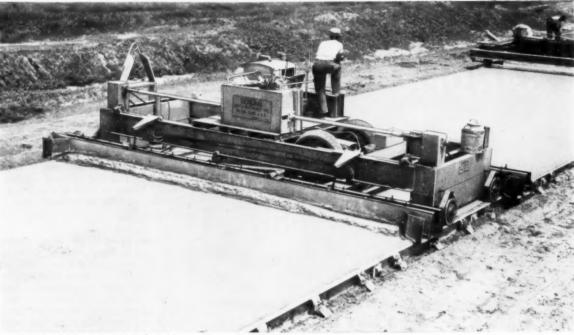
Electric Tamper & Equipment Co. Flexible Road Joint Co., The Flintkote Co., The Gar-Bro Manufacturing Co. General Motors Corp. Goodall Rubber Company Harnischfeger Corporation Heil Company, The Heltzel Steel Form & Iron Co., The Henry Manufacturing Co., Inc.

Hough Company, The F.G. Huber-Warco Company, The Ingersoll-Rand International Harvester Co. Jackson Vibrators, Inc. Joy Manufacturing Company **Keystone Asphalt Products** Company La Crosse Trailer Corporation Le Roi Company Le Tourneau-Westinghouse Co. Littleford Bros., Inc. McKiernan-Terry Corporation Mid-Western Industries, Inc. Minneapolis-Moline Company Naugatuck Chemical Div. Owen Bucket Company, The **Phoenix Products Company** Pioneer Engineering Works, Inc. **Prehy Company Republic Steel Corporation** Rogers Brothers Corp. Seaman-Andwall Corporation Servicised Products Corp. Shawnee Mfg. Co., Inc. Stow Manufacturing Co. Symonds Clamp & Manufacturing Co. Timken Roller Bearing Co., The **Toncan Culvert Manufacturers** Association

United States Rubber Company United States Steel Corp. United Steel Fabricators, Inc. Wellman Engineering Co., The Westinghouse Air Brake Co. Wick Wire, Spencer Steel Div. Wice Electric Company Williams Bucket Div. WHIJIAMS Form Engineering Corp.

Engineering Corp.
Wiscensin Motor Corporation

paving contractors are switching to General ...



GRM Model 5-S standard 20-25 ft. Finisher working on Rt. M-60 by-pass.

GENERAL FINISHER

speeds paving production for Garavaglia and Pierson!

Typical of leading contractors now using General Road Machines paving equipment is Garavaglia & Pierson, Centerline, Michigan.

On their 8 mile by-pass job along Rt. M-60 at Niles, Michigan, they are using 2 GRM Model 5-S Finishers, 1 standard 20-25 ft., 1 self-widening 10 to 16 ft. and a GRM Automatic Curing Machine.

Paving Superintendent Dave Stein says, "Our GRM equipment has performed well in all respects. We feel that the simple, rugged construction of each machine will pay off in longer life and less maintenance. The wide screeds on the finishers do an excellent job of controlling surge behind the screeds."

Users report that the General Finisher produces better results in less time. Its range of 6 travel speeds and 24 screed speed combinations permits selection of the finishing rate exactly suited to individual paving job requirements.

What's more, the Finisher's rigid structural steel frame, V-belt transmission drive and anti-friction bearing construction provide smooth operation, eliminate form-damaging rocking and twisting.

These and many other features will assure increased production, lower costs and extra profits on your jobs! Ask your General Road Machines distributor for more information about this advanced design Finisher, available in widths up to 32 ft. It's a part of General's complete line of modern paving equipment,



. for more details circle 279, page 16



Court Decisions

By Albert Woodruff Gray

Use of Road. In a suit for trespass brought by the owner of a private road in Mississippi, it was contended that as the road had been worked by the county it was a public road. "It has been well settled," said the court sustaining the claim of trespass, "that it is the right of all persons to travel upon a road and not merely their traveling on it that makes it a public road." Hunter v. Lake Mor-ri-lo, Inc., 79 So. 2d 836, Mississippi, May 9, 1955.

PRESCRIPTIVE RIGHT. Controversies involving a West Virginia highway over 26 years ago had been settled by permitting the use of the road on condition that gates be constructed and closed when the road was not in use. In a recent lawsuit to remove these gates the court held there had been established a prescriptive right to the use of the road subject to these conditions. Monk v. Gillenwater, 87 S.E.2d 537, West Virginia, May 31, 1955.

Public Highway. Indicted for killing a man while operating a motor vehicle on a public highway while intoxicated, the conviction was reversed by a Georgia Court. The act had not occurred on a "public" highway which must have its origin in a legislative act, a court order or by dedication or prescription. Baker v. State, 87 S.E.2d 644, Georgia, May 18, 1955.

ABANDONED ROAD. After a Mississippi road had been abandoned for over 30 years, suit was brought for its reopening. This the court denied. "The right which the county had in the roadway may be extinguished by abandonment and non-use for the statuory period of ten years." Pica-yune Wood Products Co. v. Alexander Mfg. Co., 86 So. 2d 480, Mississippi, April 9, 1956.

Subjacent Soil. Protest was made by a Virginia water company against lowering a highway grade compelling the relocation of the water pipe line below the road surface. The right to change the grade of the road for public convenience, the court held, was superior to the easement of the water company for its pipe line. Anderson v. Stuarts Draft Water Co., 87 S.E.2d 756, Virginia, June 13, 1955.

(Continued on page 38)



Your Wickwire Rope distributor

and our steel melter... always at your service

This steel melter—at Wickwire's open hearths where wire rope steel is made—is with your Wickwire Rope Distributor every time he makes a call.

True, he's physically at the open hearth compounding steel with the sharp eye of an expert. But your Wickwire Distributor makes his call with the full assurance that the steel in Wickwire Rope has the right chemical content and grain size because it's always produced under rigidly controlled conditions by experts.

It's just one more reason why your Wickwire Rope Distributor knows he's got top-quality rope, slings and strand to sell . . . and that these products will serve you well.





4002

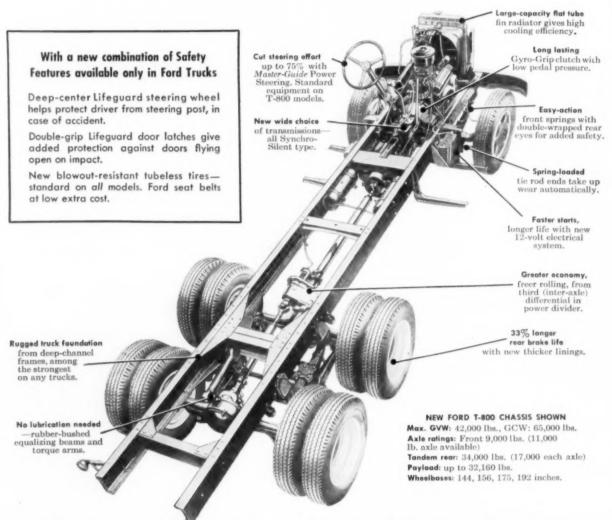
A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

. . , for more details circle 277, page 16

NOW! The lowest-priced

Miles of extra life, with extra-strong chassis features! Up to 3000 lbs. more payload than other 6-wheelers!

• Ford's new T-800 is the lowest-priced in its class—based on a comparison of manufacturers' suggested list prices. It also carries up to 3000 more lbs. of payload compared to other tandems in the same GVW weight class!



Every major body builder builds for Ford . . .



CEMENT MIXER TRUCK



DUMP TRUCK



DUMP WITH SCRAPER



TRUCK-MOUNTED CRANE



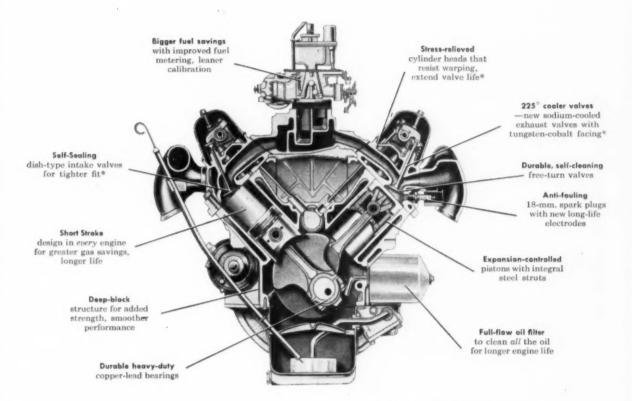
TRAILERIZED DUMP

Tandem in its class-Ford T-800

Longer-lived, dependable operation with exclusive heavy-duty engine features

0

• '56 Ford Tandems offer you the most proven Short Stroke V-8 engines in the industry—for better gas mileage, longer life, less maintenance costs. And you get a combination of longer-lasting heavy-duty engine advancements found in no other truck. Ask your Ford Dealer for details.



*Features of new Ford Heavy Duty engines . . . 200-h.p. Torque King V-8 shown . . . 212-h.p. Torque King Special V-8 available.

More fleets are buying Fords than any other make



UTILITY TRUCK



LINE TRUCK



LIME SPREADER



BITUMINOUS DISTRIBUTOR



LIGHT DUTY DUMP

. . . for more details circle 207, page 16

ROADS AND STREETS, July, 1956

One BUTLER Set-up Feeds 3 Hungry 34E Dual Drum Pavers

Job Facts:

In a 10 hour day the three 34E dual drum pavers laid 2754 feet of pavement. Hourly average 261 feet.

BUTLER has since developed equipment for even faster batching in the one man operated 0-1-0 Roadbuilders Plant. But this big job proves that even yesterday's equipment meets today's demand — IF ITS built by BUTLER.

CONTRACTORS:

M. Hoeffken Co. and Hoeffken Bros. Inc. Belleville, Illinois

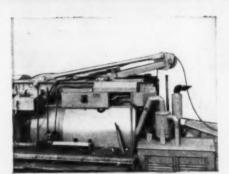
Butler Bin Company

Waukesha, Wisconsin

. . . for more details circle 190, page 16

ROADS AND STREETS, July, 1956





The A-Frame is raised and lowered by a fast acting hydraulic cylinder. In the down position, as shown above, the overall height is instantly reduced to clear bridges or overpasses. This hydraulic control allows the MultiFoote to retain all the advantages of single cable operation.



older MultiFoote Pavers are helping contractors meet the November 15, 1956 opening of this new turnpike.

This newly redesigned MultiFoote Paver with hydraulic controls and faster skip operation is giving owners faster cycle time plus a new low overall clearance height. The new MultiFoote Paver has all the advantages of single-cable skip control with its hydraulically controlled A. Frame (see left). Hydraulic controls and faster skip operation have stepped up the high capacity of the Blaw-Knox MultiFoote Paver even more so it can put out more concrete than with any other paver!

All the features that have made MultiFoote Pavers the leaders in their field have been retained or improved. The efficient double-cone drum is always balanced-whether it is loaded or empty. Simplicity of design provides the easiest possible access for service or maintenance. Shovel-type crawlers with their self-cleaning action provide the longest life, best flotation and positive traction. High operator's platform provides an unobstructed view of skip and bucket at all times.

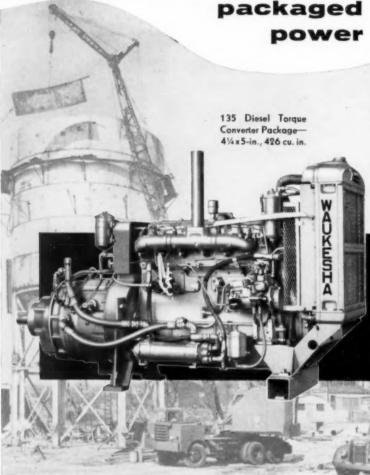
If you are bidding on any paving job, see your Blaw-Knox distributor for complete details on the New Blaw-Knox MultiFoote and other paving equipment.

BLAW-KNOX COMPANY

Construction Equipment Division 44 Charleston Ave., Mattoon, Illinois

WAUKESHA

engine torque converter packaged



Diesel · Gas · Gasoline—20 hp to 1100 hp

for torque converter application in shovels, cranes and hoists; trucks and tractors—the result of Waukesha's 15-year development program in this field. Torque converters eliminate shock to driving and driven mechanism; prolong life of equipment; boost output work 10 to 40%. Power, automatically matched to the load, is delivered smoothly without stalling.

WAUKESHA MOTOR COMPANY, WAUKESHA, WISCONSIN NEW YORK • TULSA • LOS ANGELES



. . . for more details circle 260, page 16

Court Decisions

Barricade Maintenance. Failure of the Louisiana Department of Highways to maintain a barricade and adequate warning signs at a drop in a concrete roadway to a dirt road, caused a car to overturn, injuring the driver. The state claimed the driver negligent for failure to read a warning sign 1,200 feet back. Judgment was rendered against the state. "A motorist has a right to presume a roadway safe in daytime or nighttime." Recves v. State, 80 So. 2d 206, Louisiana, April 14, 1955.

WIDENING ROAD. Plans of a town superintendent in Chautauqua County, New York, to increase the width of a road from 20 to 49% feet were ended by an order of the court against their execution. The road had not been surveyed nor established by public authority. Without the consent of the owners the widening of this road would be taking property without process of law, and unconstitutional. Jones v. Coderquist, 150 N.Y. S.2d 121, New York, March 22, 1956.

SURETY BOND VS. RENTAL. Surety payment bond was furnished by a Pennsylvania highway contractor conditioned on payment of labor and material. Power shovel rent had not been paid and the owner sued to collect. Recovery was refused. "The word 'material' did not include machinery, tools or appliances used for the purpose of facilitating the work. Rental is not a labor claim." Commonwealth v. Pavia Company, 113 Atl. 2d 224, Pennsylvania, April 18, 1955.

STREET OBSTRUCTIONS. Fences had been erected and building constructed 18 years before on an unused street in an Ohio village. The village sued to compel their removal. The court ruled, "No lapse of time will bar public authorities from a recovery of possession of lands belonging to a public highway or to compel the removal therefrom of obstructions." Village of Orangeville v. Powell, 126 N.E.2d 86, Ohio, April 22, 1954.

Use of Highway. Grants to the state by Louisiana landowners stipulated that the land be used solely for a state highway. Suit by a power company to locate its poles on this land was denied by the court. "The State has no right of ownership in the land but only the right of using it and the extent of the right is regulated by the contract creating it." Louisiana Power & Light Co. v. Diles, 79 So. 2d 150, La., March 25, 1955.

Planning better roads

by INTERNATIONAL SALT COMPANY, INC.-America's largest producer of salt



Stabilizing Shoulders with Rock Salt Costs Less . . . Gives Added Safety

Highway officials in many states have found that stabilizing road shoulders with rock salt is economical for two reasons. First, rock salt is relatively low in cost—and even with lower-grade materials, it helps provide better-wearing shoulders. Secondly, shoulders made with rock salt provide substantial savings in road maintenance. These shoulders have high density, so the aggregate is not readily blown or eroded away. And they actually protect the roadway itself by preventing water from seeping under the pavement edge.

From the safety standpoint, rock-salt-stabilized shoulders have the necessary load-bearing hardness to support emergency traffic in all weather. Soft-shoulder accidents are eliminated—and blinding dust is no longer a hazard. These modern shoulders also provide excellent drainage, so that water, snow and ice will not collect on the road surface.

To show how simple—and economical—it is to stabilize shoulders with rock salt, here is an actual step-by-step story of how this method was used on a U. S. Highway with a high traffic count. For safe, efficient stabilization of the shoulders, Sterling Rock Salt, produced by International Salt Company, was chosen.



1. The first step was to scarify and mechanically mix the shoulders to a depth of 4". Bank-run dirt with good clay content was added, as well as ¾" No. 2 stone, until proper mixture was attained.



Then, 6 lbs. of Sterling Rock Salt per square yard was spread on the shoulders. Application of this rock salt was by rotary spreader. After this process, materials were again dry-mixed.



Next, the shoulder was thoroughly wetted down. After wetting, soil was again mixed mechanically. Additional wettings were needed throughout this procedure, so that soil had optimum moisture content.



4. After mixing and wetting, all the materials were then bladed to a proper level for rolling. To provide for adequate drainage of water, a slope of at least one-half inch per foot was maintained on the shoulders.



5. Final step was rolling with rubber tires. Because rock-salt-stabilized materials compact more than unstabilized materials, the 6" depth of loose material was compacted to about 4" by rolling.

This stabilization procedure varies with particular soil and road conditions. For expert advice on how stabilization can work in *your* area, contact International.



ASSISTANCE ON ROAD

International Salt Company will be glad to help you work out an effective, economical rock-salt road-stabilization program for your system. There's no cost or obligation. Just contact your nearest International sales office.

For further technical information on rock-salt stabilization, write for International's free series of booklets, "Better Highways." Address: International Salt Co., Inc., Scranton 2, Pa.

Sales offices: Atlanta, Ga.; Chicago, III.; New Orleans, La.; Baltimore, Md.; Boston, Mass.; Detroit, Mich.; St. Louis, Mo.; Newark, N. J.; Buffalo, N. Y.; New York, N. Y.; Cincinnati, O.; Cleveland, O.; Philadelphia, Pa.; Pittsburgh, Pa.; and Richmond, Va.

FOR ROADS, INDUSTRY, FARM, AND HOME-

STERLING SALT

PRODUCT OF INTERNATIONAL SALT CO., INC.

. . for more details circle 223, page 16

LOOK AT REO

122,000 MILES ... then only a valve grind!



Mr. Lynn A. Schloss, Vice President, Ransome Company, Emeryville, Cal., reports on Reo model F-22R:

"We brought this unit into our shop when it had put on approximately 122,000 miles. We removed the head and found that all that was necessary was a valve grind. Now, some six months later, the unit has needed no further attention."

122,000 miles is actually small measure of the work performed by this Reo Gold Comet. It doesn't take into consideration the hours of work operating power take-offs, towing equipment and idling at hot, dusty, construction sites.

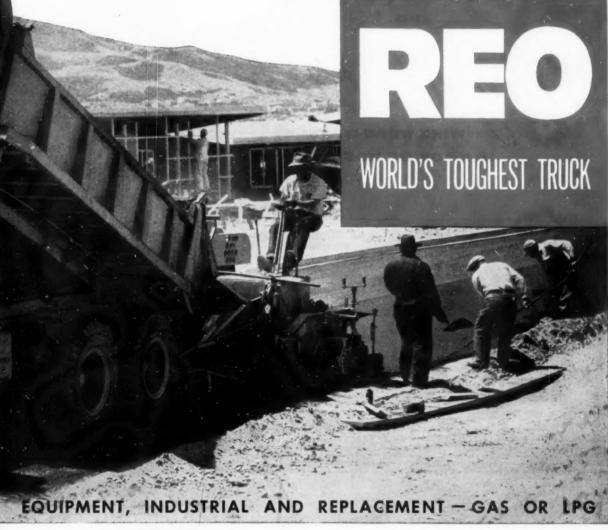
Your assurance that Reo, the World's Toughest Truck, will perform like this on your job is the famous Reo 100,000 mile or 1 year warranty on all Gold Comet engines. Call your Reo Factory Branch or Distributor and look at Reo before you buy your next truck.

REO MOTORS, INC.

LANSING 20, MICHIGAN

TORONTO, ONTARIO

SUBSIDIARY OF BUHN ALUMINUM & BRASS CORPORATION



Wire rope lasts as long as the wire it's made of!

ROEBLING'S NEW ROPE WIRE

HAS THE CAPACITY TO ENDURE...

Royal Blue

IS MADE OF 1105!

Write us for full facts on the all-steel Royal Blue Wire Rope, or contact your Roebling distributor Subsidiary of the Colorado
Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. GRANCHES: ATLANTA, 934 AVON AVE. * BOSTON, SI BLEEPER ST. * CHICAGO, 5525 W. ROGBEVELT RD. * CINCINNATI, 2340 BLENDALE-MILFORD RD.. EVENDALE * CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. * DENVER, 4801 JACKBON ST. * DETROIT, 915 FISHER BLDG. * HOUSTON, 6216 NAVIGATION BLVD. * LOS ANGELES, 5340 E. HARBOR ST. * NEW YORK, 19 RECTOR ST. ODESBA, TEXAS, 1920 E. 2NO ST. * PHILADELEPHIA, 230 VINE ST. * PITSBURGHON, 1723 HEARY W. CLIVER BLDG. * SAN FRANCISCO, 1740 17TH ST. SEATTLE, 900 1ST AVE. S. * TULBA, 321 N. CHEYENNE ST. * EXPORT BALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

. . . for more details circle 237, page 16



Now! New Heavy-Duty V-8's! With the most GO under any truck hood!

V-8 power to cut your costs!

These new 206, 226, 257 hp. modern truck V-8's in the new International V-Line have "built-in" reserve power that gets your biggest loads moving fast... a lively response that keeps them rolling with shifting greatly reduced, even on the most rugged off-highway operations. You save operating costs and you save trip time.

In short, the new International V-Line is built to set new highs in your profit column!

Tested and proved as no other trucks have ever been!

Developed and tested in the lab, then put through more than 1,000,000 test-track miles, and in 2,500,000 on-the-job miles in 39 different truck vocations.

These tests were made by profit-minded truckers with a gimlet-eye on mileage, hauling time and repair bills. Their conclusions—"GREAT, on every count!"

3 Great New INTERNATIONAL V-8 Engines!

	V-401	V-461	V-549
Displacement	400.9 Cu. In.	461 Cu. In.	548.7 Cu. In.
Bore and Stroke	41/s x 33/4	41/6 x 4-5/16	41/2 x 4-5/16
Maximum hp.	206 @ 3600	226 @ 3600	257 @ 3400
Maximum Torque	355 @ 1800-2000	420 @ 1600	505 @ 2000

Pressure Controlled-Flo Cooling! Full circulation, fully controlled. Cold weather by-pass.

"Wet" Replaceable Exhaust Valve Guides!
Exhaust Valve Faces and Seats of Stellite!
19 Pound Aluminum Flywheel Housing!

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MAKE BULLDOZERS DOUBLY EFFECTIVE



PRECO Back Rippers

These Preco Back-Rippers, mounted on the reverse side of the bulldozer mold-board, dig in and rip while the tractor backs up. They make blading easier and faster because they rip out rocks, roots and hard ground, enabling the tractor to work a full blade with less horsepower on its next trip. This is double-duty bulldozing.

Like contractors all over America, you can save time and money by using Preco Back-Rippers in building pioneer roads, clearing land and rights-of-way, in gravel pit operations, slate breaking in coal strip mines, for logging operations and mounted on pusher tractors for faster scraper loading.

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Preco Back-Rippers are completely automatic in operation — they dig in on the back-up trip and ride on the surface when going forward. There are no controls and, when desired, they can be locked up out of the way.

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6300 E. Slauson Avenue Los Angeles 22, Calif.

Please send information on Preco Back-Rippers.

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. . . for more details circle 233, page 16

Heaviest Runway Planned as Atomic Prototype

RUNWAY designed for plane A wheel load considerations of such magnitude that entirely new thickness design curves must be developed, is in the design stage for the United States Air Force. This proposed runway will be not only the heaviest in construction to date, but also one of the longest and widest. The air strip together with related paving and other facilities will be designed for the possibility of serving atomicpowered planes and will be financed by the Department of the Air Force with construction responsibility by the Atomic Energy Commission.

Design development, preparation of construction plans and construction inspection of the project are in the hands of Porter-Urquhart, McCreary and O'Brien, consulting engineers of Newark and San Francisco. This firm has a 32 months' contract.

In approaching the task of developing the thickness design, the engineers have had to gear their thinking to consideration of loads beyond any used to date. Tire pressures involved are said to be in the 300 psi-plus range, approaching that of hard rubber tires, further complicating the problem of the designers.

The site near Arco, Idaho, selected for this runway has within economic hauling distance a plentiful supply of high grade glacial gravel and other granular materials, such that there will be no serious foundation materials problem. Grading quantities despite the comparatively level terrain will be substantial because of the raised grade and crown. Paving aggregates will be imported from high grade limestone formations in the mountains to the west of Arco.

While drainage will not be a serious problem in this arid location, the frost line extends about four feet and frost resistance will be a factor in design.

Geological and soils investigations are presently in progress at the site. It is expected that new investigation of techniques will be developed in the course of the job, which will involve construction of a test section.

The project is being pushed with all possible speed consistent with the job of developing new basic design data. The construction stage is expected to be reached in 1957. If no unexpected problems arise, completion of the runway will probably be accomplished in 1958.

One of the many special design details presently under consideration is the use of flexible rubber tube method of constructing storm drains. However, past experience has shown that construction of this type usually must be reinforced. These tubes are laid in trenches and inflated and concrete pressed around it to construct drains in place. Tubes then being deflated, withdrawn and reused again.

The Atomic Energy Commission, in addition to its use of the consultants, has arranged for the Northern Pacific Division of the Corps of Engineers with headquarters at Portland, Ore., to participate in pavement quality studies for the project.

Army engineers develop expansible van

Contractors may get ideas for their field shop and parts trailers from a new truck-mounted van developed by the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Va. Designed to provide the Army with mobile units for photomapping operations, the van can be expanded to twice its 7-ft. over-the-road width.

Mounted on a standard 2½-ton truck chassis, the van can be expanded to 13½ ft. width by two men in less than five minutes, to provide a working area of 230 sq. ft.

Each side wall, built on five outrigger geams which engage sprockets mounted on a longitudinal shaft, is extended by a cranking motion. When the sides are fully extended, hinged floor and roof sections are swung into position. After the end panels are closed, the sides are retracted slightly to give weather-tight seals to all joints.

The weight of the van has been kept to a minimum by the use of specially fabricated steel sections, aluminum panels and tread plate flooring, and aluminum shapes and fittings wherever practical. The walls and ceiling are lined with plywood.

The Boyertown Auto Body Works of Boyertown, Pa., assisted in the development of the van and built pilot models for early tests.

The van has also been manufactured by the McCabe Powers Auto Body Company of St. Louis, Mo.



Now we call it the "25A" and it really is "Grade A" with its many new, profit-making improvements. It is even better than ever. A generalpurpose 3/4-yd. machine that is easily converted to shovel, crane, clamshell, dragline or hoe.

Read below some of the features this newest Lorain brings you. If you are interested especially in dragline or hoe work, read the many additional advantages at the right the new Lorain-25A has for you.

The swing clutches have been increased 20% in area for cooler, smoother clutch action and longer life-especially important for the constant wig-wag operation of dragline duty. New, smooth, easy Lorain "E-Z" controls on friction clutches. "Hydra-Ease" power control of crawler steering, tread lock, house lock and shifting of swing-travel jaw clutches. Hydraulic Coupling Power Take-off available with no-stall, no-shock, "never-say-die" application of power.

These are but a few of the important features that put the new Lorain-25A a step ahead in the general-purpose 3/4-yd. class. There are many more-you should learn about all of them from your Thew-Lorain Distributor.

THE THEW SHOVEL CO., LORAIN, OHIO, U.S.A.

for more details circle 252, page 16

NEW DRAGLINE FEATURES

- New bucket boom. Square-tubular-chord design. Lighter, stronger. Can use longer, lower booms. Increased operating ranges. Can work with bucket farther out.
- New fairlead. Swivel type. All 4 sheaves mounted on pre-lubricated, sealed, anti-friction bearings.
- New, free-spinning action of drag-in drum. Permits quicker release of drag-in cable for easier, smoother bucket casting - greater ranges.
- New, removable shell lagging of steel permits heavier, stronger drag-in cable for longer cable life, fewer shut-downs for cable replacement.



NEW HOE FEATURES

- New, longer 19-ft. boom available. Digs deeper. Increases work ranges. Tapered, gooseneck design for greater ranges, better operator visibility.
- Greater choice of cutting widths. 30", 36" and 40"
- New, removable shell lagging of steel permits heavier, stronger, drag-in cable for longer cable life, fewer shut-downs for cable replacement.
- New, heavier hoe front end. Can handle even the toughest digging. Crowds better into the hardest of materials.



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- ★ New Cross-Braced Grooves arrest cut growth
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- ★ New Multi-Edged Design—gives greater highway skid control
- ★ New, Deeper Shoulder Vents dispel heat for cooler running
- ★ New Chemi-Balanced Tread Compound—resists cutting, chipping
- ★ New Wide-Angle Grooves—actually roll away from stones

AN ALL-NEW, ALL-WHEEL ON-AND-OFF-THE-ROAD TIRE Invulnerable

to cuts and ruptures in the vital tread area!

You are looking at an entirely new kind of truck tire—the new U. S. Royal Super Fleetmaster. Its exclusive Safety Steel Shield makes it so immune to road hazards that it runs over spikes and razor-sharp axblades without losing a pound of air!

Put the new Super Fleetmaster on any wheel and watch it outperform! On front wheels, it gives greater stability. On drive wheels, it delivers extra traction. On trailing wheels, it lasts for recap after recap. Standardize on this great new tire—and reduce inventory expense!

SHETY STEEL SHIELD*

Mount this great new tire on dump trucks, transit mixers, log haulers...on any wheel exposed to heavy impacts, sharp objects, murderous terrain. You'll enjoy fewer tire failures, less downtime expense and greater service dependability.

Right now, your U. S. Royal Dealer has the new Super Fleetmaster with exclusive Safety Steel Shield in sizes through 11.00. See him—as soon as you can. And remember, you can specify "Super Fleetmaster" on your new equipment!

*Patent Applied for



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MODEL EZ — Lightest, most powerful direct drive chain saw ever developed. Only 19 pounds, full 5 horsepower. Brings down trees up to 3 feet in diameter.

. . . for more details circle 217, page 16

Safeguards in Federal Spending **Urged at Transportation Congress**

STEPS that must be taken to make certain that enlarged federal highway expenditures will be invested without waste, were outlined at Washington last month. The recommendations were made at the Sixth Annual Highway Transportation Congress, held May 8-10. Warning of the need for spending safeguards was given by Prof. Ingvald E. Solberg of Bismark (N. D.) Junior College, chairman of a Highway Action Committee. Among this committee's suggestions were the following:

Passage of highway laws with strict provisions for acquisition of rightsof-way and control of traffic access on a fair and equitable basis.

Periodic reviews and revaluation of needs for routes and use of road ratings to establish priorities of construction.

Protection of highway funds through antidiversion constitutional amendments adopted by the states.

Sufficient numbers of adequately compensated engineers and admini-strators; application of the best industrial and managerial "know how" to highway management; encouragement of liaison between county, municipal and state officials.

Another committee of the Conference, the Fair Laws and Regulations Committee, urged elimination of legal barriers to the free movement of vehicles between states, most of which restrictions are "created by impractical taxation methods, unrealistic limitations of vehicle sizes and weights, and lack of reciprocal licens-

ing arrangements."

The Conference, which drew 1,500 leaders from highway building agencies, municipal governments, trade associations, manufacturers and highway user groups, was addressed by retiring president Albert Bradley, chairman of the board of General Motors Corporation. Mr. Bradley said that the motor industry is planning for greater highway traffic by 1956, with the hope that vehicles will move far more freely than today.

For cities, he called for energetic development of expressways, off-street downtown parking facilities, better mass transportation service, uniform traffic laws. Likewise, he envisioned a sharp cut in traffic accidents, due to better driving, encouraged by improved programs or driver training, driver licensing, and traffic law enforcement, starting in the schools.

Another industry speaker was William S. Richardson, president of B. F. Goodrich Company. He told a luncheon gathering at the meeting that "we are starting our work today on what may well be a golden era for highway transportation . . . With forthcoming new expanded highway construction, we are faced with the greatest migration of people in the history of the nation.

Sponsored by the National Highway Users Conference, the Transportation Congress brought many other notable speakers, representing highway user groups as well as roadbuilding agencies, together for a discussion of mutual problems. At the close of the Washington meeting William S. Richardson of Goodrich was elected president of NHUC, succeeding Albert Bradley of General Motors.

Efficiency experts checking Pennsy. Turnpike set-up

The Pennsylvania Turnpike Commission, which has been placed under new management by the present state administration following long tenure in office by the previous group of managers, is to be the subject of a management study.

The present Commission has voted to employ an industrial engineering firm to study all phases of the Commission's activities, including administration, maintenance, purchasing of materials and equipment, and replacement of such. A previous study made by E. Norman Kagan Company will be reviewed with the idea of using parts of this study.

The announced increase in tolls was to be postponed until this engineering firm could investigate and report on the feasibility.

• Highway construction contracts awarded by state highway departments and toll facility agencies in March amounted to \$256 million, compared to \$233 million in March. 1955, according to the Bureau of Public Roads.

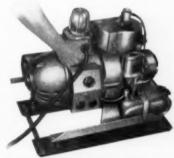
Contracts authorized by the state highway departments for January through March, 1956, amounted to \$707 million compared to \$509 million in the same period of 1955, an increase of 39%.

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SELF-PRIMING CENTRIFUGAL AND DIAPHRAGM PUMPS

Sizes: 11/2" to 3" - capacities to 15,000 g.p.h. for dewatering and water supply.



ELECTRIC GENERATOR SETS FOR TOOLS AND LIGHTS

Complete range of sizes and voltages up to 5,000 watts.



LIGHTWEIGHT POWERFUL ONE-MAN CHAIN SAWS

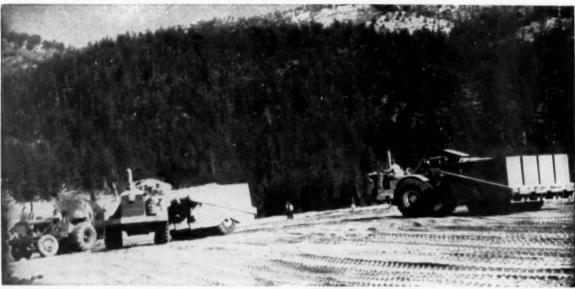
Complete line of saws with clearing and brushcutter attachments for every woodcutting job.

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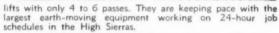
A DIVISION OF TEXTRON, INCORPORATED PORT CHESTER, N. Y.

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COMPACTING EARTH FILLS



ON HIGHWAYS, AIRPORTS AND DAMS, new records are being set every day by Southwest Compaction Rollers. Here two 75-ton rollers and Cat DW21 tractors are compacting 6" to 12"





ONE YEAR AHEAD of schedule! This record on a large earth fill dam is partially due to the improved high speed of compaction by Southwest Rollers which are used exclusively on this job.



SPEED PAYS OFF! A fleet of four 50-ton Southwest Rollers, with Cat and Le Tourneau tractors, use their weight, their kneading action of tires and extra oscillating freedom to permit faster traveling.



ADAPTORS FOR TRACTORS, most models or types, are available at Southwest. On highway and housing projects, small 20-ton Compaction Rollers can be towed by motor graders or other power equipment.



VERSATILE! Any standard 4-section Compaction Roller can be converted in a 3-, 5-, or 6-section roller. Parts for conversion are available as a complete package.

Southwest Welding

& Manufacturing Co.

. . . for more details circle 243, page 16



LIMA Type 24 Pullshovel with 17'6" boom, 6'0" bucket arm and 1/2 cu. yd. bucket.

LIMA Type 24 Jobmaster best all-purpose performer in its class

Here's a rugged, 1/2 yd. all-purpose machine with big machine features. Lima's modern, versatile Type 24 Johnaster, a quality-built specialist in its class, has been designed to fit every one of your job needs.

The Johnaster is available with gasoline, diesel or electric power. It can be equipped as a shovel, 13 ton crane, clamshell, dragline or 1/2 cu. yd. pullshovel with crawler, wagon or truck mountings. The front end equipment can be interchanged easily in the field.

Lima quality guarantees high output, low operating and maintenance costs with the Johmaster. Why not boost your operating profits by putting it to work today. For complete details contact your nearby Lima distributor, or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

COMPARE QUALITY! No other machine gives you as much as a LIMA! These quality extras are yours with the Type 24:

1. All gears have machine cut teeth.

- 2. Heat treated ground shafting.
- 3. 55 anti-friction bearings.
- 4. Air for main and auxiliary controls.
- 5. Independent propel, third drum and power load lowering (optional).
- 6. Independent combination chain and cable crowd and retract.
- 7. Differential steering (similar to tractor).
- 8. Splined shafting,
- Internal-external tooth jaw clutch for quick engagement and minimum backlash in gear train.
- 10. Inside dipper handle-square cross section.
- 11. All-welded steel construction.
- Independent boom hoist with engine controlled boom lowering.
- 13. Floating steel disc type dirt seals in tread rollers,

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Construction Equipment Division — LIMA WORKS

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DW15s move earth fast at Fort Gaines Dam



THE Fort Gaines Lock and Dam project on the Chattahoochee River is now going ahead in high gear. Moss Construction Co., of Columbus, Ga., building a 5400-foot section of the dike on the Alabama side, is moving earth at the rate of over 1000 cu. yd. per hour, and expects to double that figure this summer. Total yardage on the Moss contract will be about 2¼ million.

A major share of the earthmoving is handled by six CAT* DW15 Tractors with No. 15 Scrapers. Push-loaded by D8s, these units have carried average loads of 13.5 cu. yd., working in loose sand. Round-trip haul distance is about 3200 feet. This will lengthen as the job progresses, but in clay and other random material, loading will be faster. Good 60-foot-wide haul roads are maintained by Caterpillar Motor Graders.

In all, some 32 pieces of Cat equipment are at work here. W. P. Moss, managing partner of the construction firm, likes the performance of his DW15s. He praises their ease of handling, operator comfort and balance of weight to horsepower. "I have used Cat machines for over 20 years," he says. "The fact that my present equipment is all Cat is due to my belief

that Caterpillar leads the field in design, quality control in manufacture and, most important, in service."

The DW15 is in all ways a modern heavy-duty earthmover. It gives you a dependable Cat Engine with 186 HP (maximum output); new tubeless tires on drive and scraper wheels that eliminate tube and flap trouble and reduce down time; fast, easy-operating controls and 10 forward speeds. It has won acceptance everywhere on its profitable performance.

Ask your Caterpillar Dealer for a demonstration on your own job. He backs the DW15, like all the machines he sells, with service and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

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NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE
... for more details circle 193, page 16

ROADS AND STREETS

Big Borrow Loads

MOVED OVER RIVERBED HAUL ROADS

Two contractors utilize private roads for large yardages of imported borrow for urban freeway project in Los Angeles. Sprinkler system for sandy borrow pit also a feature.

W HERE to secure large yardages of imported borrow, and how to get the material to the job, are often chief problems in building freeways in the Los Angeles area. Because such haulage problems are blossoming out on urban projects in many other cities today, both engineers and contractors may find interest in the schemes used by two Los Angeles contractors. The projects involved are for segments of the San Bernardino Freeway (formerly called the Ramona).

One of the contractors, Peter Kiewit Sons' Co., has a 3.96-mile section extending west from the freeway's crossing of the San Gabriel River. This \$6,400,000 complete-package contract, while requiring only negligible roadway excavation, needed 2,000,000 cu. yd. of imported borrow for its raised grade. The job is broken up by 19 twin underpass bridges for cross streets.

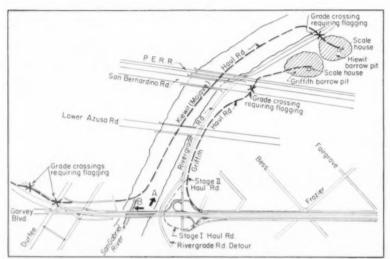
The other contractor, Griffith Co., of Los Angeles, has a similar 3.3-mile section extending east from the river.

This \$3,500,000 job, also with very little excavation, has required about 1,000,000 cu. yd. of imported borrow. Both jobs were awarded late in 1954, and are expected to be paved and completed during the 1956 year. These notes describe the borrow phase of the two projects.

• Borrow Specifications. California's specifications for embankment permit the use of any material that will meet compaction requirements. Common California state highway practice is to indicate approved borrow pits

• A pair of P & H Sierra loaders taking a 31/2-ft. bite in the wetted sand.





 Sketch of haul road scheme — borrow for bulk of filling hauled over roads flanking the San Gabriel River's dry roadbed.

available to the bidder to use if he so elects. The contractor pays a royalty to the pit owner. His bid includes items for borrow excavation in place, with a separate item for compaction moisture but not for rolling. Such were the specifications for these two jobs.

- Borrow Procedure. The Kiewit firm subcontracted with the Mojave Corporation of Norwalk, Calif., for delivery to the grade of all imported borrow and imported subgrade material. This is a large oilwell service organization which has branched out into heavy construction hauling. At the start of borrow operations, material was brought from various
- Compaction of fills on the Kiewit section of San Bernardino Freeway was performed chiefly by a Southwest Welding 75-ton compactor, drawn by a DW21 Cat unit equipped with Goodyear wide-tread tires. Note how soft sand is packed into a flat configuration, aiding mobility of equipment.

sources within economic hauling distance, using 20-ton semi-trailer enddumps and other hauling equipment. Some of the sources were other construction jobs held by Kiewit or his subcontractors, where spoil yardage was available. Borrow thus secured was at times found to be unsatisfactory due to excess clay and moisture. Certain material heavy in fines could be used in dry weather, but during rainy weather clayey material made trouble for equipment on the grade and had to be covered up with more granular material, necessitating sudden switches in borrow sources. The small amount of clayey material used was confined to the lower lifts.

A major source of borrow material for a time was the spoil from nearby Whittier Narrows Dam, where Los Angeles County was currently constructing a lake for recreational purposes. Mojave's equipment obtained several hundred thousand yards of borrow from this source.

It is interesting to note that loads from all these sources, as well as the chief source to be described, were delivered at various points throughout the 3.96-mile project. Embankment construction along the entire job had to be synchronized closely with structure work and other project phases.

This brings us to the chief source of Mojave's borrow delivery for Kiewit, and the source for all of the Griffith borrow. Approximately one million cubic yards for each contract was taken out of the borrow site consisting of abandoned workings of Consolidated Rock Products Co. Located adjacent to the dry (most of the year) bed of the San Gabriel River, and about 1% miles dead haul from the freeway line, this area consisted of a mass of tailings and natural sand and gravel of high quality for filling but having sand's characteristic troublesomeness underfoot for the equipment.

Mojave acquired easement from the Los Angeles County Flood Control Board for a 1½-mile haul road along the river. Only minor leveling was required to put the roads in good condition for high-speed hauling, although frequent blading and sprinkling were necessary for maintenance.

• Mojave's Pit Operation. The Mojave pit loading operation, utilizing nearly flat areas, was built around two P&H Sierra loaders, which at the production peak turned out as high as 500 25 to 50 ton loads or about 15,000 cu. yd. of material per 8-hour shift. The machines were drawn by an Allis-Chalmers HD-21 and a Caterpillar D8 tractor respectively. The loaders usually worked inward on rectangular perimeters.

Ponding of borrow areas during the night before entering with the loaders was done systematically by





 100-ton Fairbanks-Morse scales used by Mojave Corporation to weigh out loads from main pit.



- A 30 to 50 ton load per minute, sometimes even more closely spaced, thundered over this private road operated by Mojave Corporation. View in direction "A" — see sketch on opposite page.
- Looking along the same haul road, in direction "B". Off-highway hauling permitted larger axle loads and higher maintained speed.







(Upper): Diking pit area, preparatory for laying out sprinkler system.
 (Lower): Sprinkler on 5 axles, keeps Mojave's haul road watered down.

Mojave Corporation, for two reasons. It insured uniform moisture content, thus eliminating the need for manipulation on the grade. And it left the fine fluffy-when-dry sand in a con-

solidated state that made for easy movement of equipment.

Sprinkling was done with a piping system consisting of some 3,300 lin. ft. of 8-in. steel trunkline pipe and



1,100 lin. ft. of 3 to 6 in. aluminum laterals. Laterals were coupled with Miller & Piston couplings, and fitted with "Rainbirds" spaced every 30 ft. along the pipes. This system, common in California irrigation practice, supplies the equivalent of ¾ in. of uniform "rainfall" per hour over the sand bed.

Water was supplied from an old well activated by Griffith Co. and equipped with a new 500 gpm Lane Bowler electrically driven pump. Pit areas being readied for the following day's loading were given a piping layout, while a motor grader operator threw up shallow berms for containing ponded water and controlling runoff

• Big Haulers. A feature of Mojave's hauling was the use of big wagons of a type that has been developed in the Los Angeles area for over-road and off-road transport. As many as 13 of these haulers were used at the peak, including some rented units. The machines included Sterling trucktractors with 30-ton, long-wheel-base bottom-dump bodies, and Mack trucktractors with 20-ton units of similar design. Bodies were of Cook or Standard manufacture. All units have 200 hp Cummins diesel engines.

The 30-ton wagons carried loads as large as 50 tons in the absence of any highway axle load restrictions. And the 20-ton rigs carried loads up to 30 tons or heavier. These machines bore down the haul-road straightaway at 30 to 45 mph, slowing down on reaching the project right-of-way. Mojave's specially built 5,000 gal., 10-tired, all-wheel drive sprinkler was constantly on the job.

Pit output was checked by Fairbanks-Morse scales which tallied better than a load a minute during peak of operations. A conversion factor was used to double-check the tonnage against pay yards in place.

- Fill Construction. Embankment construction procedure on both jobs was influenced by the numerous underpasses which broke up the grade into short working areas. The contracts awarded just prior to adoption of the new California "results" type embankment rolling specifications require use of either a 3-wheel roller or an 8-ft. wide dual sheepsfoot unit for each 150 cu. yd. per hour of placement. Sheepsfoot rollers towed by heavy tractors on either job were
- Glimpses of the aluminum and steel piping system used for watering Mojave's big borrow pit. Saturation to several feet depth during the previous day was the general procedure.





• Griffith Company's private haul required flagmen and signs at junctions with several arterial streets.

often concentrated immediately back of abutments, while rolling back of structures as well as in open areas was aided by a Southwest Welding 75-ton rubber-tired compactor. To help Kiewit's 75-ton compactor get around in the sand, it was towed by a DW21 tractor equipped with oversize Goodvear tires. A 3,500 gal., 10-wheel sprinkler added moisture principally to help the sand pack quickly for easier movement of equipment.

The Kiewit-Mojave borrow operation reached a peak of 14,000 to 15,000 cu. yd. per 8-hour shift from all sources, with a 2½ to 3 mile average one way haul from the consolidated pit and considerably longer hauls with reduced (legal axle) loads from other sources. Two-shift operation was maintained at times. During much of the job period, however, delivery rates were held to 6,000 to 10,000 cu. yd. per day due to limitations at the borrow source or to syncronization with other job phases.

• Griffith Project. Griffith Co. worked a smaller 25-acre pit adjacent to Mojave Corporation's, using a similar sprinkling system. This company's haul roads included a 1.6-mile dead haul along the opposite bank of the San Gabriel River from Mojave's hauling, utilizing an easement from the So. California Edison Co., and the L. A. County Park Department.

Public traffic was forbidden on both contractors' riverside raceways, which were protected by flagmen at local street crossings.

Hauling was done by 6 Cat DW20 and 6 DW21 units, supplemented by as high as 8 additional rented DW20's, Loading was done on a 3 to 6 percent downgrade with tandem pushers in the soft sand. Three Cat D8 pushers worked,

the back pusher swinging off from the load while the third pusher was starting another load. The operators developed skill in such tricks as undulation of the pan to assist heap loading of the tricky sand. About 5,000 cu.yd. per 8-hour day was delivered with an average 2.6 mile haul. The borrow was usually delivered to two simultaneous locations to speed the work, each grade



 Griffith Company's pit loading operation was aided by utilizing as steep a downgrade as possible, and by tandem loading and undulation of the pan (see above right) to force heaped sand loads.





Welding 75-ton compactor.

· Compacting on San Bernardino Freeway, Kiewit section, using Southwest

outfit including a Southwest 30-ton pneumatic tired compactor and sheepsfoot units. Somewhat typical of the job pattern along this freeway, the Griffith of cation was "split down the center." About 60 percent of the yardage was delivered to construct the new eastbound roadway. When the bridges and paving for this roadway was completed, traffic from the existing two-way highway was diverted to a temporary two-way pat-tern on the eastbound roadway, and grading and other work begun for the westbound. Borrow hauling had to be synchronized, to again use this familiar word.

Thus is outlined some of the procedures in excavating, hauling and placing borrow material on a pair of projects in the current \$16 million construction program for the San Bernardino Freeway. Part of the Los Angeles metropolitan plan of the California Division of Highways, the projects represent the combined effort of the department's large District VII staff under newly appointed assistant state highway engineer Edward T. Telford, who succeeded Paul O. Harding recently retired. L. R. Gillis is district engineer and F. B. Cressy assistant district engineer, construction, B. N. Frykland is senior highway engineer and group project supervisor on the San Bernardino Freeway.

Ward W. White is superintendent for Peter Kiewit Sons' Co., Darrell Harris for Mojave Corporation, and H. C. McGregor for Griffith Co.

Heavy tourist traffic

A heavy influx of motorists are arriving in the north over the Alaska Highway this summer, according to

news dispatches. The 1520-mile highway built at great speed during the war between Dawson Creek, British Columbia, and Fairbanks, Alaska, is presently a gravel surfaced road. Recent travel has totalled 30,000 to 40,000 persons per year.

In the past decade, accommodations have gradually built up until today hotels, gas stations, and garages are available for travelers and hilly stretches have been gradually improved here and there.

Experimental stretches of asphalt surfacing have been placed at the southern end near Dawson Creek and around White Horse, midway up the

Political pressure is being agitated for further paving, the cost of which, however, will be extremely high due to the necessity of importing asphalt materials over long distances.

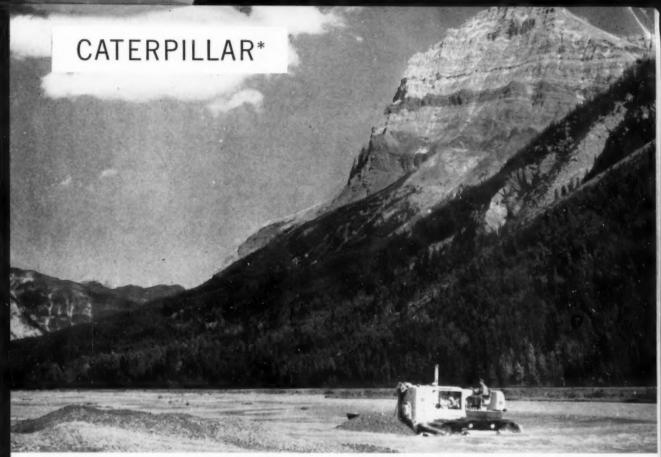
Backfill in tight spots behind abutments and wingwalls on contracts in the Los Angeles area, in some cases has been compacted with a truck crane and heavy concrete weight. A concrete-filled oil drum, for example, may be lifted and dropped a number of times, from heights limited to 2% or 3 ft. so as not to produce too much vibration and disruption of the fill structure.

Griffith Co., according to their chief engineer, J. A. Holmstrom, had replaced this rather crude method and currently is using vibratory equipment on another freeway project. This is the company's Santa Ana Freeway contract located near Santa Ana, south of Los Angeles, where an Essick vibratory roller drawn by a D2 tractor and also a hand drawn Essick vibratory unit are being used to compact fill behind struc-

Enabled by the structural design, eliminating inaccessable areas, much of the tamping immediately back of abutments on Los Angeles Freeway work today is done by 30 to 75 ton rubber-tired compactors or sheepsfoot rollers.

· Heavy compactor making quick job compaction behind bridge abutment.





IN BRITISH COLUMBIA, a D9 builds a dike to keep water from a borrow pit where it is push-loading DW21s on the Trans-Canada Highway construction. The owner, General

Construction Co., Limited, Vancouver, reports, "This D9 push-loads 225 DW21s and Scrapers per day with riverrun gravel." The D9 is equipped with a No. 9A Bulldozer.

IN JUST ONE YEAR, THE D9 WINS COMPLETE ACCEPTANCE

Across the continent, contractors make it standard equipment on tough jobs

Just one year after its introduction, the Caterpillar D9 Tractor-the biggest yellow machine of them all-is standard equipment in the construction industry. From British Columbia to Florida . . . from Massachusetts to California ... on every conceivable type of job ... enthusiastic reports roll in from satisfied contractors who have bought it. The exclusive Turbocharged engine of this Caterpillar giant is making the dirt fly on highway construction and relocation, on land clearing projects, dam and canal jobs, and at large building developments. Reports Minnesota contractor George W. Johnson, "Here is packaged power that we, of the construction industry, never have been offered before." Whatever the reason for this universal enthusiasm . . . power, ease of operation, simplicity of maintenance . . . one fact stands out. Never before has a piece of heavy equipment been accepted and put to use so quickly. CONTINUED NEAR CHARLESTON, S. C., a D9 clears and 'dozes 150 acres in Bushy Park project to develop water sources on a \$4½ million industrial site development. Over 3 million yards will be moved by owner, Robert E. Lee & Co. of Manning.



D9 ACCEPTED (continued)

BIGGEST TRACTOR PASSES ITS TEST BY FIRE

The first year in the field is always the most crucial for new equipment. Performance is watched closely and weighed carefully by veteran contractors. Here the D9 passes its first birthday with flying colors on widely different jobs across the nation... in soil conditions that include sand, peat, yellow and blue clay, decomposed granite, boulders, shale and gravel.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.



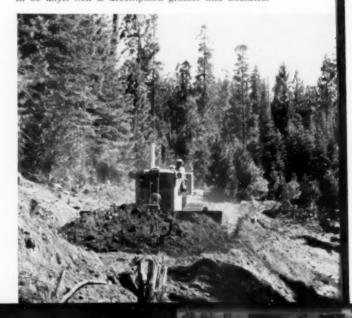
IN MONTANA, a D9 push-loads a No. 90 Scraper on a U.S. Highway 93 project for its owner, Rud King Construction Company, Missoula, Montana. The 31-cu.-yd. (heaped, with sideboards) No. 90, pulled by a D8, is working in a 150,000-cu.-yd. cut near Florence, Montana.



NEAR IDAHO CITY, a D9 pioneers sidecuts, widening and relocating a 11.37-mile section of highway for Morrison-Knudsen Co. In rock and sand, the D9 is making 40 passes an hour, 14 ft. wide, 200 ft. long.



IN STRAWBERRY, CALIF., a D9 builds a 4-mile access road to Beardsley Dam site. The owners, Tri-Dam Constructors of Strawberry, are roughing out this road in 60 days. Soil is decomposed granite and boulders.





IN PARAMUS, N. J., building a shopping center, a D9 'dozes shale and clay to help load scrapers quickly for Sam Braen

Construction Co., Wyckoff, N.J. After 'dozing, the D9 push-loads 'two CAT' DW21s in less than 60 seconds.

IN MINNESOTA, this D9 singlehandedly reduces this cut (450 ft. long by 150 ft. wide) to 8% grade for its owner, Johnson Construction Co., Grove City. The D9 handles

10 to 15 yards a pass on the cut involving 237,000 yd. of fine sand, blue and yellow clay. Job is relocation and widening of U.S. Highway 16.







 Mechanics who thought they knew all about Euclid end-dumps were shown some of the finer points they may have been neglecting. Lathe operation being demonstrated in the Boise shops. At right is Al Smith, machine shop foreman.

Equipment Maintenance

M-K Sends Mechanics to School

AN intensive eight-week training course was given last winter to 18 top mechanic employees by Morrison-Knudsen Company, Inc. These selected mechanics gathered in Boise, Idaho, headquarters of the huge M-K organization, coming from various projects and shops of the company from Mexico to Alaska.

This unusual school was given by the M-K management in the realization that the many new machines and advanced technical developments, such as torque converters, turbo chargers, no-spin differentials, and so on, require even the best and most experienced mechanics to "begin over" with much of their knowledge of machines.

Beginning January 16, the "scholars" attended classes six full days a week. Their studies stressed preventive maintenance, the course including demonstrations made by factory and field instructors, equipment manufacturers and supplier organizations.

The training also included actual maintenance work in M-K's head-quarter's shops at Boise; shop mathematics, mechanical blueprint reading; and leadership training.

As reported by M-K's employe publication, the "Em-Kayan", ten manufacturing and supply companies took part in the training course by sending representatives to Boise. These included the Euclid (General Motors), Standard Oil of California, Caterpillar, Ingersoll-Rand, Bucyrus-Erie, Detroit Diesel Engine (GM), Engine Life Products, Cummins, Smith Welding, and Roebling wire rope.

The school was under the direct supervision of Matt Rice, traveling master mechanic for M-K, with Mark Robinson, Director of Procurement of the firm in over-all charge. Actual shop work was supervised by men in the company's Boise shop force. Lee E. Knack, the company's Director of Labor Relations conducted the leadership training part of the school, assisted by James Wolcott.



 At the mechanic's school in Boise. Instructor, borrowed from teaching staff Boise Junior College, is covering the rudiments of shop mathematics.



 Here are the men who took the intensive course, and who since have gone back to their jobs in many parts of the country.

Briefly Noted . . .

One by one the reports are piling up on how arterial relocations in and around cities are helping rather than hindering local business.

The latest example comes from Elyria, Ohio. This city, you will recall, is the one which held up the Ohio Turnpike project by a lawsuit and a wrangle over whether to let the turnpike cut through.

Dire forecast of blight and business disruption has been replaced, since completion of the turnpike, by a report of a new building boom along the turnpike in the vicinity. Immediately surrounding the superhighway inside and north of Elyria, 500 new homes are being built or planned, worth \$8,500,000.

Mayor Grant Keys of Elyria is quoted as saying that city growth has surpassed all pre-turnpike expectations. "Our blight has turned out to be a blessing in disguise," he said.

When quality control is lax on highway construction, it is not always easy to trace the contributing causes. Properly qualified engineers and inspectors are scarce these days. Use of consultants solves the problem sometimes but again it may not, especially when the blame for laxity centers on factors beyond the consultants' control.

Along the Indiana Turnpike, this reporter recently saw concrete paving in progress on the various contract sections, in which quality management varied from very good to very bad.

For example, joint assemblies being installed at transverse saw-cut locations were not always placed with extreme accuracy, and on one job, were being subject to bull's eye hits by loads dropped from the paver

bucket. It has become increasingly clear that slip dowels must be placed with hairline accuracy to insure the functioning of contraction and expansion joints if untimely deterioration at joints is to be forstalled.

Stockpiling of concrete aggregates also was not being done on some jobs along the Indiana Turnpike in accordance with good practice. Instead of placing aggregates in layers and taking material off in layers, the piles were coned up to considerable heights and the slopes undercut by the frontend loaders in rehandling. Possibly the segregation caused by such methods was the reason for the sloppy mix seen at 3 P.M. on one job on one particular day, requiring a stoppage of production while the finishers worked off the excess laitance.

Under circumstances such as these, an observer wonders where the responsibility lies — whether top management is fully aware of the things happening in the field, or whether the contractors feel that they can "get away with it." Or whether the value of quality control in terms of more durable and economical constructions has not been sold all up and down the line.

The engineer shortage can be "blamed" on many things these days. More and more construction companies are employing engineers, not merely for field parties, estimating, and day-to-day job problems, but for executive responsibilities. A well-known consultant aide, for example, recently became assistant chief engineer for one of our large and fast-expanding turnpike builders.

Many company owners are themselves engineering men. Some one in the contractor's camp needs to have a great deal of technical savvy these days in order to understand and comply with job requirements.

Also to be noted is the extent of the competition for technical men by our armed forces. The Air Force is currently embarking on a stepped-up training program to develop qualified paving engineers out of its existing personnel. Perhaps the state highway departments can get some kind of inspiration from this effort, which is centered at the Air Force Institute of Technology. Located at Wright-Patterson Field at Dayton, this school offers to selected Air Force personnel an 8-week brush-up course in managerial methods and newest technical developments. This course, and a longer one leading to a degree in conjunction with local universities, both give major attention to grounds and installations, and especially to pavements.

With a quarter-billion square yards of airfield pavement to maintain and repair at 300 bases here and abroad, and a multi-billion-dollar heavy runway program in progress, the USAF, and the Corps of Engineers — along with Budocks — will gobble up thousands of men who are just the kind of people desperately needed in the civil highway and street departments.

This problem of "guns or butter" competition is one more reason why state legislatures must act at once to get better salaries and working climate for its highway building agencies.

Home-Made Dredge Keeps This

Aggregate Plant Humming



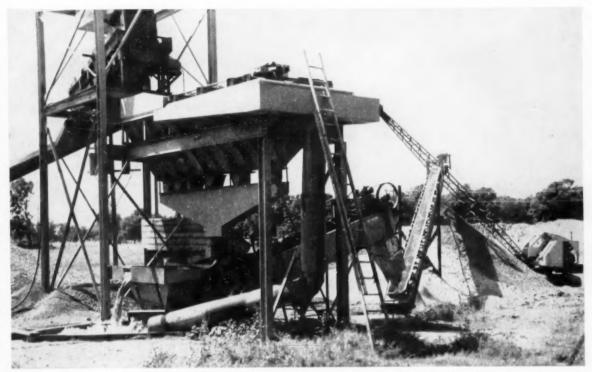
"Lake Cruise" on an Indiana farm. GM Detroit Diesel powered dredge which fed the sand plant.

PICTURED here is a sand-gravel plant and concrete batching station operated by Brandt Sand and Gravel, of Morocco, Indiana. Located recently along U.S. 41 in Newton County, the plant is designed to utilize an extensive glacial gravel and sand deposit lying near the surface. The production was planned to supply the local county with road gravel, produce ready-mix aggregates, and sell sand to miscellaneous local builders. The sand is graded to meet mortar specifications of state agencies in Indiana, Illinois and Michigan.

Dredge pumping from a ground water pond was adopted as an economical method of moving material into the plant. A home-made barge was equipped with a Hetherington & Berner sand suction pump



This dredge delivered glacial material via a Hetherington & Berner 6-in. suction sand pump to screens and wash plant located immediately behind the camera.



Turning the camera around, here are the Pioneer screens, Eagle washer, and Universal belt to stockpile. Note effluent from scalping tank which is sluiced back into the pond. Chute to left takes gravel to stockpile.

having an 8-in. suction line and a 6-in. discharge line. Power was furnished by a GM Detroit Diesel Series 71 engine unit. This rig pumped about 40 tons per hour, using 1,000 gal. per hour of water which ran to 10 to 15% solids. Delivery was via a 24-ft. length

of rubber and steel hose and a 6-in. spiral welded steel pipe. Water was reclaimed by a return wier in order to maintain pond level.

to maintain pond level.

Material first passed over a grizzly which scalped stones larger than 3 in. size, then passed through a Pioneer

3 ft. by 10 ft. double deck screen, which produced % in. gravel and 3/16 in. minus sand on the two decks. Gravel was chuted directly to adjacent stockpile.

(Continued on page 84)



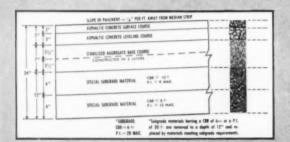
• Hetherington & Berner sand pump mounted on the pit's edge.





On goes ASPE

ENGINEERED FOR RUGGED WEAR



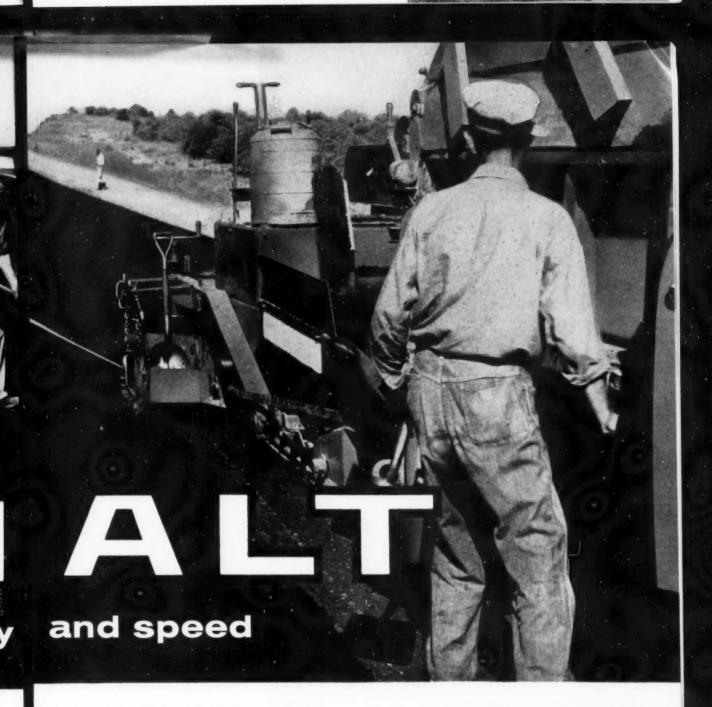
Cross-section shows whole pavement structure of typical Turner Turnpike section. Large photograph shows laying of the 2" asphalt wearing course over the 3" asphaltic concrete leveling course. Both are compacted to not less than 92% of theoretical density. (96% lab.)

Asphalt-paved Turner Turnpike (Oklahoma City to Tulsa, 88 miles) is an engineering and financial success.

It's a 28,800-pound-axle load structure (see cross-section) engineered for maximum durability and smooth, safe riding. Its cost was low . . . only \$431,818 per mile. It was laid fast . . . 29 months from the time sod was broken. Its safety record is enviable . . . about ½ the national fatality average. Its revenues are way up . . . \$1,546,319.94 over operating expenses and bond interest from the opening, May 1953 to November 30, 1955.

People liked this Turnpike Wanted more like it

Oklahoma highway authorities responded quickly to the success of asphalt-paved Turner Turnpike. By



June of 1955, work was under way on the 88.5-mile northeast extension.

Modern, heavy-duty asphalt construction like this has proved ideal for turnpikes and primary roads. People like driving on asphalt "ribbons of velvet smoothness". Taxpayers like its low costs. You'll like its design versatility, its speed and ease of construction, its rugged durability. Often, local aggregate can be used.

Modern highway design calls for Asphalt pavement —it's rugged, durable, smooth, safe and economical. Make your next design asphalt.



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THE ASPHALT INSTITUTE

Asphalt Institute Building, College Park, Maryland

. . . for more details circle 182, page 16

Ribbons of velvet smoothness . . .

MODERN ASPHALT HIGHWAYS



· Results of poor compaction at the end of a bridge.

For Superintendents

and Foremen

By J. V. Clarke

Assistant Construction Engineer, Virginia Department of Highways, Richmond

Practical Pointers on

Compaction of Embankments

URING the past year or two, Virginia contractors have heard quite a bit about the compaction of embankments. This has been brought about due to the number of surface failures and settlements we have ex-

Our specifications call for the embankments to be compacted to 95% of their theoretical density or optimum moisture content. It is quite pos-

From a talk at annual meeting of Virginia Road Builders Association

sible that many of us do not know just what optimum moisture content means. In a layman's language, it means "the most favorable condition." We all know that a very dry soil will not compact. A very wet soil will run. When it is just right it is at the optimum. A good rule of thumb is to squeeze a hand full of soil. If it is powdery and breaks up, it is too dry. If it oozes through your fingers, it is too wet, but if it compacts well and holds together when you release the pressure of your hand, it is very close to optimum.

is very near the optimum. In dry weather it is entirely possible that the material close to the surface of embankments will lose moisture by evaporation, making it necessary to sprinkle. Similarly in wet weather it is frequently necessary to aerate the surface of fills as well as cuts before grading can proceed. Micaceous materials are probably

· Except in extremely wet or dry

seasons, the material taken from a cut

our worst problem, as far as compaction is concerned. It has been found that although surface compaction is hard to obtain, we can usually get the desired compaction a foot or two below the working surface.

Unsuitable materials are sometimes difficult to compact due to their plasticity. While it is desirable to waste unsuitable materials, it is not always economically feasible to do so. In many cases, we arrange to dispose of unsuitable materials in the lower layers or on the edges of the fills. When these materials are used in the lower part of a fill, they must be capped with a blanket of good material. It is often necessary to end dump the good material to a considerable depth prior to rolling being done in order to keep the unsuitable material from pumping through the blanket.

• There is no possible rule of depth to be followed in these cases. It is (Continued on page 70)



Settlement in sidewalk adjacent to a drop inlet.

New "B" Rear-Dump offers you big capacity PLUS LITUURIAN METHANALE IN MOGE B MOGE B

High speed

B Tournapull Rear-Dump has forward speeds from 2 to 34 mph, plus two reverse speeds, 2 and 4 mph. Wide selection of speeds enable "B" to climb steep grades,

Easy loading

Loading of new "B" is made easier by large "target" area of bowl. Its 17'8" length, 10'2" width, and 7'6" depth make it ideal for any size shovel. Rear of body provides wide, low entry for dipper to give extra speed advantage for the excavator. Big 35-ton capacity can make every load a profitable one.

Fast dumping

At the touch of a dashboard switch, body raises to vertical position. Edge of bowl swings behind and below rear wheels so rocks cannot roll forward to lodge against wheels nor can material pile under rear end.

180° turn in 35' space

Two wheel prime-mover turns 90° right or left . . . machine in normal use makes non-stop 180° turn in space only 35′ wide. With body in dump position, machine can turn 180° in only 27′. This maneuverability of "B" allows you to work in tight quarters where smaller conventional haulers often cannot go. Jockeying back and forth to get into loading position is eliminated.

7536 square inches of braking surface

Heavy-duty air brakes with 7536 sq. in. of braking surface improve maneuverability . . . add to operator confidence for faster operation on steep grades and narrow winding haul roads.

New "B" also offers these additional features

Big 7-ft. high 2-ft. wide low pressure tires for better flotation.

- Rugged body construction for longer equipment life.
- Simple, positive electric controls for fast, easy operating.
- Lower maintenance because there are no hydraulics, no long driveshafts, no springs or spring hangers.

Now available with optional tailgate. Ask for full details on how the Big "B" can serve you.



Tournapull — Trademark Reg. U. S. Pat. Off. BR-888-G-b



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



Results of compaction over a pipe line.

Compacting of Embankments

(Coninued from page 68)

simply a matter of good judgment. The compaction of the original ground, in areas where embankments are to be placed, is also an important item. This is called for in the specifications when fills of less than 10 ft. are to be used. Wherever possible, unsuitable material should be removed prior to placing an embankment. This is extremely important where low fills are to be placed. While we all realize the importance of keeping the removal of unsuitable material to a minimum, it should be borne in mind that all of the material which may be expected to give trouble should be taken out at the time of the original excavation. Reopening a hole is both expensive and time consuming, furthermore, it cannot usually be done with the equipment normally used for the original excavation.

From time to time, fills are built across marshy areas where it would be impractical to remove unsuitable material. In such cases, end dumping is allowed and a mat of considerable depth should be applied prior to compaction being started.

• One of our contractors recently stated that he compacted his embankments in 3 in. instead of 6 in. layers. Our specifications say that 6 in. is the maximum. If anyone wishes to use a thinner layer, it is felt that less trouble will be encountered in obtaining

compaction. This is certainly evident from references to the compaction reports in this contractor's jobs. As to the cost of using a smaller lift — just let us say that this particular contractor seems to be doing pretty well.

• We are having trouble obtaining

compaction near the edges of fills. This condition is apparently due to the use of a single drum roller. The operator is hesitant to drive close to the edge of the fill and, as the roller is usually not as wide as the tractor, no compaction is obtained close to the edges. This is not usually the case where double or triple drum rollers are used. The lack of compaction on the edge of a fill contributes greatly to erosion with resultant costly repairs.

Just why are we talking so much about compaction? Surface patching to bring a pavement up to its original

elevation is costly.

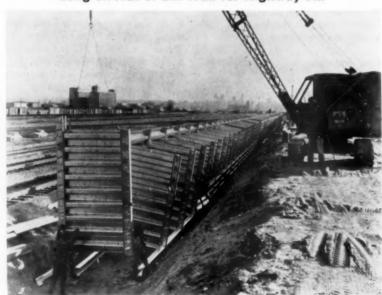
At the time a job is bid, it is known that we expect compaction. We expect to keep this matter constantly before our inspectors, and we hope they will keep it before you.

The relationship between the highway department and the contractors has always been good. It is a partnership. Neither of us could get along without the other. We know you are going to do your part, and we are certainly going to do ours.

Population growing

The population of 168 metropolitan areas in the U.S. rose 13.7% from April 1950 to April 1955. The suburban parts of these areas gained 27.8% in this time, while the central cities gained only 3.8% in population.

Long Stretch of Bin-Wall for Highway Fill



• Here is one of the longest metal bin-wall jobs ever installed. Located near the airport at Kansas City, Kansas, it keeps the new highway fill (Rt. No. 71) off the adjacent railroad tracks. The wall ranges from 5 to 18 ft. in height and is 5,200 ft. long. The contractor erected the wall at a rate of 250 ft. a day. Photo courtesy Armco Drainage & Metal Products, Inc.

Here and abroad...
tractor-on-rubber
speeds highway improvements

E arthmovers around the world have found the versatile 17 mph Tourna-tractor a handy tool on a wide range of dirtmoving assignments. Typical jobs and problems encountered by contractors in Chile, Iraq, or Malaya are usually quite similar to dirtmoving "headaches" in Maine, Texas, or California. For example, here's how 5 Tournatractors, working under adverse conditions, speed work assignments for the Imperial Government of Ethiopia.

To improve their national highway system the Ethiopian Government works 5 high-speed Tournatractors on a busy 12 month-a-year schedule. These rubber-tired tractors operate in rainy highlands, arid deserts, in near-freezing temperatures, and often in equatorial heat. Material ranges from wet mud to abrasive sand and rock...yet Tournatractors have proved efficient under all conditions.

Prevents landslides near Addis Ababa

The advantages of these versatile units are clearly illustrated by a re-



Tournatractor strips heavy sod and levels subsoil to prepare athletic field for a police training school. Rolling action of big lowpressure tires help compact material.

cently-completed landscaping project near Addis Ababa. The job consisted of benching hills to keep landslides from blocking a modern all-weather asphalted highway which circles the mountains around the city.

建筑

Tournatractor worked at more than 8400 feet above sea level to doze a mixture of loam, decayed top vegetation, and dry, hard red clay. It dug out many deeply rooted stumps which dotted the area. It crossed pavement and traveled along the highway without damaging the bituminous surface. Its mobility, plus high rate of production, enabled the unit to complete the project well ahead of schedule. Government officials say this one rubber-tired Tournatractor did the work in one-third less time than could a combination of two crawler-tractors.

Levels 2500 cu. yds. in 40 hours

Another of the Government's Tournatractors performed equally well when it stripped and leveled a new athletic field for the Ethiopian Police Training School near Addis Ababa. In five 8-hour days, this machine moved 2500 cubic yards of earth and sod. Total included all rough and final dozing; even some finish-grading.

Excess earth is dozed into valleys where it will later be used to fill around trees and

culverts. Big 4-wheel air-brakes give operator confidence to work safely near steep banks.

Meanwhile, the third Tournatractor stockpiled materials for highway surfacing. At the same time, the fourth and fifth Tournatractors, equipped with power control units, pulled 11-yard LeTourneau-Westinghouse Scrapers to build shoulders and drainage ditches along highways.

From time to time as needed, the 17 mph Tournatractors took time off from other assignments to pull LeTourneau-Westinghouse Rooters that ripped old bituminous road surfacing before retopping.

Tractor-on-rubber speeds can help cut costs and save time on your earthmoving, too. Ask your LeTourneau-Westinghouse Distributor to help you estimate savings possible on your operation.

Rooter, Tournatractor—Trademark Reg. U.S. Pat. Off. T-978-G-bw



LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



Suggested Quality Control Method

• Three point consistency meter.

For Highway Concrete

Simplified sampling plus use of the Kelly Ball, Chace Air Meter and Hime-Willis test suggested as a step toward needed improvement in control of concrete.

By Glenway Maxon

Consulting Engineer, Milwaukee, Wisconsin

ALTHOUGH the following methods are written around the control of the quality of concrete for central mix plants, it can be applied in part to paver mixer operations.

Objections to present methods of sampling — methods of making compression cylinders, and slump cones, are mostly that the answers procured are meaningless in respect to uniformity of product. These methods of sampling and testing tend to improve the appearance of uniformity and hide local defects. The first object of quality control is uniformity of quality, the second is proof of uniformity, and the third — to maintain control over cost within limits and without delaying production.

ASTM sampling methods are slow, they average, they remix — and maybe do a better job in that respect than the mixer. Slump tests take too long and delay production. They, too, average the concrete. Present-day tests for entrained take too long.

The duty of any manufacturer is to control the quality of its product. When the manufacturer is required, it will cause to be certified under oath as to the quality of the various items it produces. The concrete manufacturer might well certify as to the concrete it produces — but tools for quality control, justifying such certification, are either not available, or are too laborious. Most of them interfere with production while telling only part of the story of uniformity. The contractor cannot hope to test frequently, nor can he rely on the accuracy of the testing personnel needed even if he can retain reliable technicians.

New test methods must be devised or utilized to measure water-cement ratio; strength of parts of the batch — not of the average; air content of parts; cement distribution. Then, with scale checking and certification, aggregate and cement testing, or certification, the only remaining elements of uncertainty are the changes due to transportation and placing, which should offer no difficulty.

Proposed Procedure

Now in a highway job, let the contractor certify to the engineer every week — the accuracy of the scales; sieve analysis of stone and sand; complete tests of mixer performance (one load); time of mixing; time of material entering mixer; time of water entering mixer, and length of time water precedes aggregate; and time taken to discharge.

Samples could be taken from first tenth, center, and last tenth of this batch. Slump tests, air tests, and compression cylinders or beams for flexural testing can be taken from all three. All three of these can be bracketed with Kelly Ball Tests, Chace Air Meter tests, and Hime-Willis test for cement content. This work would be done by the contractor with the approval of the engineer and with an inspecting engineer present if so required.

This mixer and plant performance test would be used as a guide, to indicate from week to week improvement in quality.

During the week, the Hime-Willis test would be performed on two mixes per day — taking samples from first tenth, and last tenth of the batches chosen. Chace Air Meter and Kelly Ball tests could be made on these samples. Also, if found advisable the latter would be made every fourth or fifth load by an apparatus suspended over the path of the vehicle and lowered momentarily. By checking the vield against levels in the concrete vehicle, a further computation might be easily made from these two samples as to correct batching, and if devia-

(Continued on page 74)



...to give you bigger loads in shorter loading time

One operator and this powerful "Twin-C" pushes your biggest production scrapers for capacity yardage. On many jobs it will do this in less time than it takes 2 crawler-pushers with 2 operators. Rubbertired speed, and articulated steer, give quick maneuverability for direct-line push, save seconds in picking up next load.

Synchronized power matches speeds of earthmovers — Twin-C speeds match loading speeds of modern rubber-tired earthmovers, take advantage of combined power of loader and pusher to get big pay loads fast. Torque converter, teamed with constant-mesh transmission in both front and rear engines, reduce "lug downs" and gear changes necessary in many pushers.

More usable power with rubber pushing rubber — You get greater usable horsepower and coordinated

pushing force when you push rubber with rubber. You get full floating traction...tire treads follow tire treads...no loss of power to flatten out rounded tire-tracks into flat track-tracks. And Twin-C's 80,000 lbs, weight rides on four big 29.5 x 29 tires with 22-ply rating; each 2'5" wide for firm ground-gripping traction on any type of surface.

Additional Twin-C advantages:

- Forward speeds to 20 mph and fast reverse, plus "articulated" steer, enable Twin C to position faster behind scrapers,
- Big 49½ x 88" heavy, concave push-bowl is positioned by an electric motor to take full advantage of contact area provided by scraper push-block.
- Push-button electric controls with instant response, the same type controls used on LeTourneau-Westinghouse scrapers for 8 years, give you positive power-steer and accurate push-plate-positioning.

 Power-transfer differentials on both engines match pull to traction, automatically apply power to wheels on firmest footing. Keep big pay-loads rolling in sand, mud, and loose materials.

If your fleet includes production scrapers, you will want more information on the Twin-C Pusher. Ask your LeTourneau-Westinghouse Distributor for full details,



65,900 lbs. Drawbar Pull! Powerful 416 hp Twin-C Pusher push-loads scraper fast. In recent Dynamometer tests, Twin-C, operating in sandy clay footing, registered drawbar pull of 65,900 lbs. in low-speed range. Twin-C—Trademark TW-1039-G-b

LeTourneau-WESTINGHOUSE Company

Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company



Suggested Quality Control Method For Highway Concrete

(Continued from page 72)

tions are apparent, trouble could be sought out and corrected at once.

All results of test under the forgoing procedure could be posted in a prominent place. Deviations from the previous results, particularly improvements, might be noted - with comments. Suggestions leading to improvements can be rewarded and the means of quality control pointed out to all personnel, with emphasis on teamwork. The reasons for the present lack of interest are due more to the methods of testing now in use and the most uninteresting testing tools. Tests are too tedious and sometimes too inaccurate to excite enthusiasm. Strength tests come too late to be readily correlated, in our minds, with faults which might be traced to aggregates, cement, air-entraining agent, batching, or mixing.

Air Meter Method

On-the-spot testing and checking can produce much improvement in concrete without adding to its cost.

In respect to new testing apparatus, the Chace Air Meter has a maximum diameter of 1 in. and is about 7½ in. long. It costs \$10. It has a brass cup 3½ cu. centimeters in capacity. The bottom of the cup is supported by means of a rubber cork. This rubber cork is inserted into a cylinder of glass 1 in. in diameter, 3 in. long, with an extending stem about % in. in diameter, extending above for 3 in. with gauge marks etched for the purpose of reading the air content.

The operator fills the cup with cement mortar, fills the glass tube with isoprophyl alcohol, sets the mortar cup into the cylinder containing the alcohol, and presses the cork in; holds the tube vertically with the cup lowermost, and adjusts the alcohol to the uppermost mark. By tipping the instrument back and forth, the mortar comes out of the cup and the alcohol dissolves the air content; so that when the instrument is brought back to its vertical position the proportion of air in the mortar can be read on the markings.

By knowing the amount of mortar in the concrete, the operator can take readings and convert to percentage of air in the concrete.

Strangely to say, this instrument has been found to be remarkably accurate. It was used by Howard, Needles, Tammen & Bergendoff on the New Jersey Turnpike, where the engineers had eight in use. It was found to be accurate by the Bureau of Public Roads in tests made in the 1955 summer. Many highway departments and laboratories are using the meter as a check. In respect to labor, it requires about one-tenth of the time that the present equipment called for in ASTM Standards.

Hime-Willis Test

The Hime-Willis test has been published by the Portland Cement Association. It has been written up by the American Concrete Institute, and additional information appeared in the ASTM Bulletin. October, 1955, issue. The apparatus is shown on page 39 of that Bulletin issue, with the mortar and heavy media in centrifuge tubes before and after centrifuging. The data on this method are quite conclusive as to the ability to sepa-

rate cement from the sand, providing there is no sand of specific gravity approaching that of cement in the mixture.

After the laboratory determinations are made, a test on the distribution of cement in respect to the mortar in a concrete mixer, or from different portions of a batch, can be made in the course of one and one-quarter hours by one technician with apparatus not costing more than \$200.

The Kelly Ball is a penetration method of determining the relative placibility and, to some extent, consistency of

The accompanying photograph is of a tool which also uses the penetration method, but averages three-points with each application.

The Kelly Ball now appears in ASTM Specifications. It is much faster than any other method of checking

(Continued on page 78)





A practical low-cost sand blast unit. Portable or stationary. Quickly removes rust, scale and paint from struc-tural steel, highway bridges, storage tanks, ship hulls. Also renovates brick or stone buildings, trucks, trailers, pipe and fittings. Cleans up highway equipment and cement trucks before re-painting. Can be fitted with a wet adapter nozzle for eliminating dust. Remote nozzle control for stop or start

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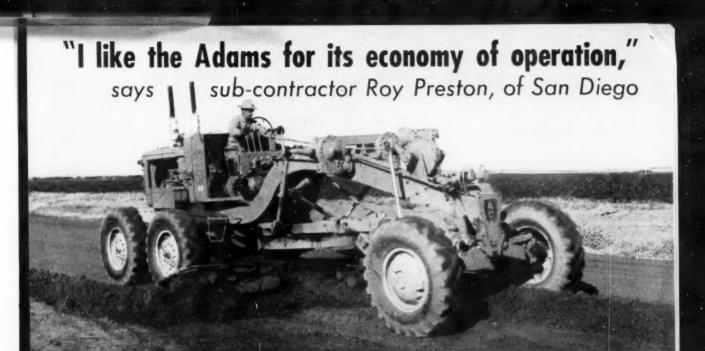
RUEMELIN MFG. CO. 3990 N. Palmer 3t. Milwaukee 12, Wis.

Manufacturers and Engineers SAND BLAST AND DUST COLLECTING EQUIPMENT. WELDING FUME COLLECTORS.

. . . for more details circle 239, page 16



for more details circle 234, page 16



Grader above is spreading sub-base material on a county road connecting Mt. Signal and Coyote Wells, Imperial County, California. Owner Preston is working for prime contractor N. L. Basich, of South San Gabriel. Contract calls for 22.6 mi. of grading and roadway-mix surfacing. On this project, Roy Preston used his

Adams 550 to pioneer haul roads, rip old asphaltic pavement, dig ditches, finish slopes, level sub-grade, and fine-grade before top surface was applied. Preston says, "I find there is substantial saving in fuel consumption with the Adams over other makes of motor graders, and maintenance and repairs are lower than any other I have used."

Adams does more work, in less time, at lowest cost

Let us prove it to you in actual demonstration! You can best see why this grader gets more work done when you watch the smoothness of a modern Adams at work. See how easily it picks up the load, how constant-mesh transmission shifts easily — with no clash of spur gears.

Eight forward speeds (1.4 to 25 mph) provide the necessary wide speed range to handle all operations at fastest practical rate with maxi-

mum power. Three additional "creeper speeds", optional (.23 to 1.82 mph), gear the grader down for accurate finishing in tight places, make it easy to penetrate rooty, rocky terrain, eliminate shock loads from machine. And 4 reverse speeds (1.8 to 13 mph) save time on shuttlegrading and mixing. No other grader offers this wide range of speeds which enables Adams to do more work in less time at lower cost.

Make a date!

Accept our invitation to see a modern Adams in operation. Contact your local LeTourneau-Westinghouse Distributor. He will be glad to take you on a field trip, let you see these graders at work, convince yourself.

A size ADAMS for every need

Model 660

— 150 hp Diesel Engine, 27,730 lbs. Model 550

— 123 hp Diesel Engine, 23,500 lbs. Model 440

— 104 hp Diesel Engine, 21,500 lbs. Model 330

- 80 hp Diesel Engine, 20,500 lbs.

TraveLoader—A high-speed, heavy-duty, self-propelled, belt-type loader for picking up and loading materials into trucks from windrows or stockpiles.



Leveling sub-grade in preparation for roadwaymix surfacing, Adams 550 holds grade to close

tolerance. With wide range of speeds, operator selects most practical speed for maximum power, AG-24-G-bw

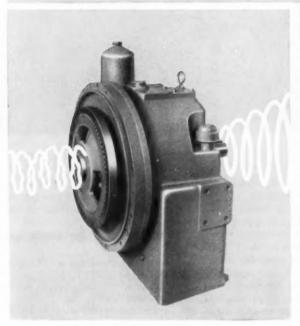


LeTourneau-WESTINGHOUSE Company

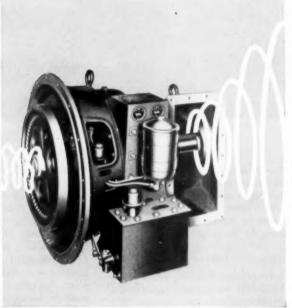
Peoria, Illinois

A Subsidiary of Westinghouse Air Brake Company

Single-Stage or Three-Stage Torque Converters?



Single-Stage Torque Converter



Three-Stage Torque Converter

The answer to this question depends largely upon the characteristics of the equipment you manufacture or use and the jobs it is required to do. Naturally, many factors must be known before any engineering department can be expected to make recommendations.

Generally speaking, however, when it is desired to have minimum pulldown from governed engine speed—with maximum power output over a wide range—and to produce high torque ratios for hoisting or heavily loaded vehicles, a three-stage torque converter, with torque multiplication up to six times, may be most desirable. On the other hand, where mild torque conversion is required, as in certain types of vehicles and in other industrial equipment — a

single-stage converter may be the best choice.

Now, for the first time, you can benefit from the unbiased recommendations of one manufacturer in choosing a torque converter—single-stage or three-stage — with the exact capacity and torque transmission characteristics to give your equipment maximum efficiency.

The Twin Disc Clutch Company's new line of single-stage torque converters—now available in the 1500 Series—complements its time-tested, universally accepted line of three-stage units. Single-stage or three-stage—from 30 to 1000 hp—you can depend on Twin Disc Torque Converters to give your equipment better performance . . . less downtime . . . and greater earning potential.

In addition to offering the most complete — the most versatile line of industrial torque converters available, Twin Disc manufactures fluid couplings in a wide range of sizes for engines and motors from 3/4 to 850 hp, and friction clutches for applications from fractional to 1050 hp.

If your construction equipment requires heavy-duty power transmission components, standardize on Twin Disc—the world's largest manufacturer of fluid and friction drives for powered industrial equipment — for your complete line.

TWIN DISC CLUTCH COMPANY

Racine, Wisconsin

Hydraulic Division, Rockford, Illinois . . . for more details circle 256, page 16

ROADS AND STREETS, July, 1956



"FORD POWER STARTS QUICKLY

hangs on

to heavy loads — doesn't hesitate a bit!''

says FREDERICK VOLK, Fox Point, Wis.

**We handled approximately 60 cubic yards in close quarters with the clam shell in about three hours work. We were digging a drainage trench for a 42" culvert and had to go around various obstacles including trees and a 12-ft. fence to swing the clam over with the load. I like the Ford power of this Hydrocrane because it starts quickly—hangs on to heavy loads and it doesn't hesitate a bit!59





The Bucyrus-Erie Model H 3 Hydrocrane that Mr. Volk operates for the village of Fox Point is powered by a Ford "172" industrial engine. Built for versatility, mobility and economy, the Hydrocrane gives precision control through a hydraulically operated closing bucket and a variety of attachments. Upper deck revolves 360° with telescoping high-lift boom capable of from 30- to 38-ft. full load length. Hoist rams provide free line speed of up to 190 f.p.m. with 6,000 lbs. line pull. Ford Industrial Engines can provide similar power plants for all the major types of construction equipment.

It will pay you to specify Ford engines on your next piece of equipment because Ford is the only industrial engine manufacturer to offer modern Short Stroke design in a *full line* of overhead-valve 4-, 6- and 8-cylinder engines. These engines cut piston travel and piston speed which reduce friction and wear. The result is more usable power and extended engine life. This means you get jobs done quicker and more economically.

Right down the line . . . from the 134- and 172-cu. in. 4-cylinder engines . . . to the powerful 6-cylinder 223-cu. in. engine . . . and the big heavy-duty V-8's of 272 and 332 cu. in. displacement, you'll find Ford engines are years ahead in engineering. Engines that are designed to give power-packed performance more economically and for a longer period of time.

Autothermic pistons help maintain proper piston-to-wall clearance and prolong engine life.

Large overhead valves of high chrome-nickel alloy improve volumetric efficiency, resist warping.

Free-turn intake and exhaust valves reduce the possibility of valves sticking, help maintain compression longer.

Iron Alloy sleeves are centrifugally cast for better heat transfer and wear characteristics plus longer cylinder wall life. FORD "172"



For detailed information, phone or write today to:

INDUSTRIAL ENGINE DEPT., FORD DIVISION OF FORD MOTOR COMPANY, P.O. BOX 598, DEARBORN, MICH. . . . for more details circle 206, page 16

Suggested Quality Control

(Continued from page 74)

for consistency, and although its accuracy may not be of the same order as a slump cone, it can consistently pick out batches having wide deviation, particularly where central-mixed concrete is used for paving and open bodies for transportation.

The Kelly Ball or the 3-point Penetration Tool can be used as a frequent check, while slump cone tests are generally few and far between.

How to use AE-55 Air Indicator

(Pat. Pending)

Manufactured by L. M. Chace North Bridgton, Maine

- Fill brass cup with cement mortar paste, excluding particles larger than No. 10. Rod material in cup with small knife blade or wire to compact mortar. Strike off excess even with top of cup.
- · Hold finger over stem opening and fill large end with isopropyl alcohol to line on glass (alcohol may be inserted in the stem opening after stopper is inserted, with syringe or dropper if desired)
- Insert stopper in tube, invert indicator and adjust liquid level to top line of

stem making sure that all air bubbles are removed and that the stopper is firmly inserted.

- · Place finger over stem opening to prevent loss of any liquid and gently roll the indicator from vertical to horizontal several times until all the mortar has been dissolved out of the cup into the
- · With indicator in vertical position carefully remove the finger from the opening and count the number of spaces from the top to the new liquid level. In the case of mixes with 15 cubic feet of mortar the number will directly represent the percentage of entrained air in a cubic yard of the concrete. For different mortar content refer to the table
- · When ready to empty the instrument care should be exercised to invert the glass to flush out particles of sand from between the glass and brass to prevent jamming when removing the
- · Wash and clean the assembly immediately after use with clean water.

Conversion Table

For following mortar contents per cubic yard multiply the stem readings by the following constants:

10	c.f.	by	0.67	19	c.f.	by	1.26
11	c.f.	by	0.73	20	c.f.	by	1.33
12	c.f.	by	0.80	21	c.f.	by	1.39



AE-55 air indicator.

13 c.f. by 0.86	22 c.f. by 1.46
14 c.f. by 0.93	23 c.f. by 1.52
15 c.f. by 1.00	24 c.f. by 1.59
16 c.f. by 1.07	25 c.f. by 1.66
17 c.f. by 1.13	26 c.f. by 1.72
18 c.f. by 1.20	27 c.f. by 1.78

Consult Your **Roads and Streets** Advertising

Money Saving Coordination Southern Tire's GIANT TIRE RETREADING

Experienced contractors will recognize time and moneysaving coordination in use of heavy equipment in this picture of an Oman Construction Company, Inc. highway job.

Southern Tire Company is maintaining the drive tires on every piece of equipment on this job . . . another way that Oman's saves time and money.

Pickup and delivery, at the job site after work hours, by Southern Tire representatives will help you get the most from your equipment by minimizing downtime. Southern Tire's giant retreads help you save money on tire replacements, as

well—savings up to 40% compared to the cost of new tires. Let Southern Tire retreading service help you. Call your tire dealer now and specify Southern Tire retreads.

ROCK SERVICE, TRACTOR TYPES OR RIB TREADS

All sizes from 1100 x 24 to 2700 x 33, and new sizes 29.5 x 25 and 29.5 x 29.

SUPERIOR THREE-SECTIONAL MOLDS

Three—Sectional molds assure no buffing to breaker strips, regardless of growth.













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for more details circle 242, page 16

"Czar" planned for Maryland highway work

In Maryland, where a very large road program is shaping up, and where unfortunate publicity over highway management has appeared in the newspapers in the recent past, Governor McKeldin is planning a major change in top highway management. According to a news report, a \$25,000 a year roads "czar" would be appointed, taking the place of the present highway commission chairman and two commission members.

In their place under this czar would be a director and two new commission members who would serve only in an advisory or consulting capacity. A business man in Baltimore is reported to be the Governor's first choice for this new position. The name of the Maryland State Roads Commission would remain unchanged, it was understood, and the reorganization would be accomplished by executive order from the Governor's office within the framework of the present law.

Highway freighting sets new record in 1955

Highway planners, concerned with the revenues that truck operations bring for roadbuilding, as well as the problem of designing road-beds for heavy vehicles, are studying the latest figures reported by the nation's freight carriers. Motor carriers showed a 14% rise over 1954 in ton-miles traveled. This phenomenal continued growth, capping the steady rise since the war, is seen to provide the surest possible underpinning for the necessity of financing an enlarged highway program over the next decade.

The motor carrier industry expects an investment of \$3 billion in new trucks, trailers and other equipment

during 1956.

As reviewed by the Chamber of Commerce of the United States, other aspects of the current transportation picture will similarly interest highway and street planners:

• Automobile mileage rose 4.6% in 1955; auto registrations increased 5.1%, truck and bus registrations, 2.6%.

• Intercity bus traffic continues at a high level. New luxury buses are expected to help recapture traffic lost to private autos and air travel. Charter business and non-passenger service are on the increase.

◆ Local transit, however, continues its decline in nearly every city of the nation, with operators of elevated and underground rapid transit, as well as surface lines, exploring means to relieve traffic congestion downtown, improve service and lure riders.



Investigate this new USF Leave-In-Place steel form for concrete bridge floors. Made of galvanized steel, trapezoidally corrugated in laying widths approximating 24" for clamping direct to structural flanges, it particularly adapts itself to structures involving high or hazardous conditions. Permits all form work from top-side and eliminates shoring and stripping of old-fashioned wood forms. Once in, you leave-in-place. Low cost—to be sure!

- Erect fast-Leave-In-Place
- Eliminate shoring and removal expenses
- No warping, cracking, shrinking, or swelling
- Save manhours and material waste
- Speed-up schedules—save dollars and penalties



Here's the New 18-15" Euc"

that sets a new high in 15-ton Rear-Dump Performance!



DUMPS FAST AND CLEAN

Smooth body interior and tapered rear chute assures clean shedding of the load well back of the rear wheels—an important feature for dumping into hoppers or over the edge of waste banks, Lycoming Silica Sand Co. in Pennsylvania has used 15-ton "Eucs" for years and now has added two R-15 Rear-Dumps to their hauling fleet.



STAY ON THE JOB LONGER

Victorville Lime Rock Co. in California uses 2 Model R-15 "Eucs" for hauling rock and overburden. Rugged body and frame withstand the impacts of loading, hauling and dumpling heavy excavation in construction, mine and quarry service.

Built for heavy off-the-highway service, 15-ton Rear-Dump "Eucs" have paced the field for over 20 years. They've reduced hauling costs on hundreds of the toughest jobs in mine, quarry and construction work... delivered "plus" performance year in and year out.

This model R-15 incorporates the engineering advances, the easy operation and maintenance features, resulting from unequalled field experience with other Euclid Rear-Dumps of the same capacity. It provides the dependable work-ability that means more payloads per day at lowest cost per ton or yard moved.

Have your Euclid dealer give you full details on this new 15-ton Rear-Dump and the complete line of Euclid earth moving equipment. He'll be glad to show you why so many users have proved for themselves that Euclids are your best investment.

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

The R-15 is your BEST BET for Lower Hauling Costs!

Advanced design results from 20 years of leadership in

Rear-Dumps

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Rear-Dumps

Some of the
OUTSTANDING
FEATURES
of the R-15

- 10½ yd. body 30,000 lb. payload
- 218 h. p.
- loaded top speed of 25 m.p.h.
- hydraulic booster steering
- air assist clutch
- free floating springs
- 14.00 x 24 drive tires
 (16.00 x 25 optional)



POSITIVE CONTROL OF DUMPING

Double-acting 3 stage Euclid hoist and hydraulic system gives the operator fast, positive control of the body position at all times. Dumping angle of the body, in fully raised position, is 68°. Body, frame and hoist are designed and built as an integral unit. McDowell & McDowell are using six R-15 "Eucs" to houl heavy excavation at a big plant site job in Noshville, Tennessee.



SPEED AND STABILITY

The 5 speed transmission and Euclid planetary axle provide a top speed of 25 m.p.h. with full 15 ton payload... 27 m.p.h. with 16.00 x 25 tires. Free floating Euclid spring suspension gives maximum stability empty or loaded under all road conditions... permits faster safe travel speeds. Dale Bloom had a fleet of 6 Rear-Dump "Eucs" on this Kansas Turnpike job—2 of them the Model R-15.



EASY OPERATION

Full width cab offset to left for maximum vision, air assist clutch, booster steering, 218 h.p. engine, fast acting hoist, free floating springs and fully adjustable seat contribute to driver comfort and easy operation. Four of these new Rear-Dumps worked on a highway relocation job of W. ... Menefee Construction in Missouri.



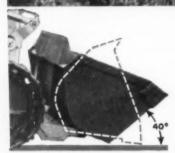
Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



NOW . . . a loader which combines crawler traction with rubber-tired speed . . . a loader with unmatched visibility plus perfect balance

the all new International Rear-engine Payloader



Tremendous pry-out force is obtained by using breakout pads on ground as fulcrum for leverage. Load forces transfer to ground instead of to machine.

40° bucket tip-back at ground level permits digging of bigger bucket loads, plus retaining of more of load in bucket during lifting and carrying. For speed, maneuverability, and big capacity in a crawler-loader, see the new International 13/4 yard Model 12 Payloader!

This amazing 77 net hp machine seats its operator in front of the engine, close to the bucket, where he can always see what he's loading, and where he's going. It balances the tractor between rear-mounted engine and front-mounted bucket. It distributes weight evenly over entire length of tracks, to give you better traction, longer track life, better stability on grades, less bogging down in spongy ground.

Your operator moves faster on the

new Payloader, too. He can go up to 10 mph forward, 13 mph reverse. He changes speeds or direction rapidly through a full-power shift, three-speed, full reversing transmission. He need hardly slow down or reduce engine power to shift gears. He gets maximum digging power from the machine's torque converter. And he steers easily, too, controlling each steering clutch and brake through one power-boosted lever (no foot steering brakes).

Try this new International Model 12 Payloader for yourself. Let us arrange a demonstration. Call soon! A good deal awaits you!

See you at the ROAD SHOW CHICAGO Jan. 28-Feb. 2, 1957



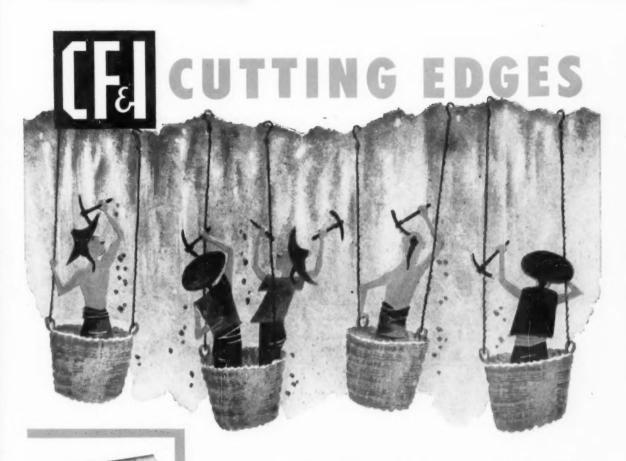
International Construction Equipment

International Harvester Company, 180 North Michigan Avenue, Chicage 1, Illinois

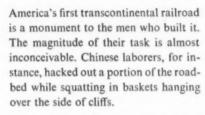
A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Pipe-Boom Tractors... Self-Propelled Scrapers and Battom-Dumps...

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. . for more details circle 278, page 16







Fortunately, today's contractor has modern earth-moving equipment at his disposal—mechanical giants that do the work of 10,000 men. And these giants stay on the job only because suppliers throughout the nation provide quality parts to keep them running. Parts such

as CF&I Cutting Edges which are known throughout the industry for their dependability.

Rolled from special analysis open hearth steel that is carefully selected for its toughness and abrasion resistance, CF&I Cutting Edges are available in a wide range of lengths, widths, thicknesses and hole spacings; flat or curved; with beveled or square ends, and in a variety of finishes. All are products of CF&I's quality control program that's complete —from ore through finished product.

CUTTING EDGES

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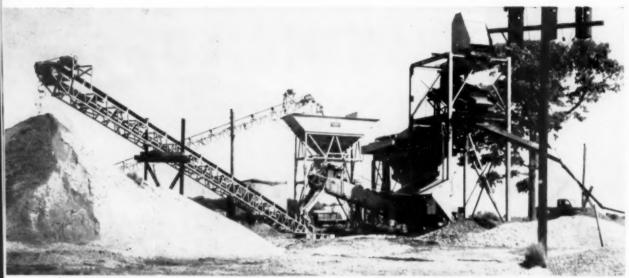
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. . , for more details circle 198, page 16

ROADS AND STREETS, July, 1956

83



· General view of the entire plant. Screens and wash plant, right foreground. Winslow Binanbatch Batcher in background.

Home Made Dredge

(Continued from page 65)

Sand laden water flow enters a 20-ft. Eagle water scalping tank (a new hydraulic-electric valve controlled unit) where sands are classified and silt and excess water are removed. Selected sand then passes through an Eagle 36-in,-diameter by 25-ft. single screw unit where deleterious material is washed out and product is dewatered. The entire plant including pump box, chutes and structurals was designed and fabricated by Eagle to suit this company's pump and screen.

Processed sand was stockpiled via

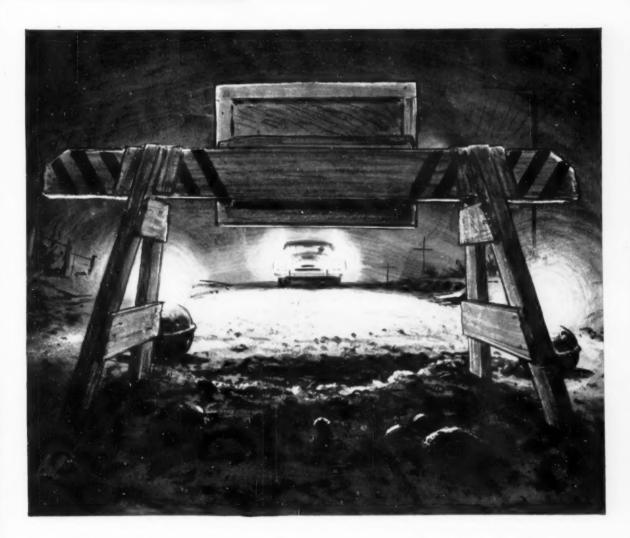
Processed sand was stockpiled via a Universal 65-ft. motorized belt conveyor unit, where it was loaded into trucks as needed by an Insley ½-yd. crane with Williams bucket.

(Continued on page 86)



 (Above): Ready-mix customer getting a load-out. Bagged cement in trailer along side. (Below): Intermittent demand for batch bin operation was met by using small loader to feed materials onto the belt.





End excessive road repairs

Stabilize your roads with Morton Salt

◆ Cut aggregate loss ◆ Save man-hours and maintenance money ◆ Reduce accidents caused by loose gravel



Send for this free book on how Morton Salt helps you build better roads at far less cost! Mail this coupon today!

Gravel roads stabilized with Morton Salt give more service per dollar than roads built by any other method. (Savings in aggregate alone more than pay for the salt.) You get smooth, durable, water-repellent surfaces that require minimum maintenance.

Stabilizing the base course of primary roads with Morton Salt helps prevent the 9 out of 10 road failures which result from faulty foundations.

Please send me your free booklet on salt stabilized roads.

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MORTON SALT

INDUSTRIAL DIVISION

Dept. RS.7 120 So. La Salle Street, Chicago 3, Illinois



. . . for more details circle 229, page 16



• Another 23-ton load of sand goes over the Winslow scales and away.

Home Made Dredge

(Continued from page 84)

Gravel and sand batching for readymix concrete use was done by a separate orbit of activity. The two aggregates were picked up from stockpile as needed to keep the batch bins full. This was done with a Ford-Ferguson front-end loader and deposited via a feeder box onto a belt, going thence to a Winslow two-compartment Binanbatch plant. Truck mixers were backed under the batcher, and after receiving aggregate were given their cement from bagged cement stored in a weathertight trailer spotted alongside.

At the scale house the outgoing loads were weighed on Winslow 50-ton double-beam platform scales for the contractor's books, and the front and rear axle loads checked to see that they met state highway load limitations for over-the-road hauling.

This plant easily handled the 400 to 600 tons per day demand, including intermittent call for ready-mix gravel.



• Another view of the gravel-sand batching plant, at site of sand production.

Bridge design loads — an economic comparison

A reduction in railway design requirements from E 72 to E 60 or E 50 standard loading, as requested by certain railway managements, is considered not justified.

Though railway figures are not directly applicable to the highway problems, analogies drawn from this report can be useful to highway bridge engineers who find themselves under pressure to cut construction costs below the necessities of sound practice.

"It is true that the ratings of present diesels are in the E 35 to E 56 range, but loads are now being hauled rating as high as E 82. Wrecker cranes, snowplows, piledrivers and other railroad equipment rate up to E 65. There are still some steam locomotives in service which produce ratings in the range of E 72. The history of steam locomotives shows a steady increase of weight on drivers, and we can be sure that the trend of design in diesel locomotives will follow the same pattern, since tractive forces depend on driver weights.

"The supporting data shown in the accompanying tables indicate that the decrease in over-all cost of a bridge to be realized by reducing its rating from E 72 to E 50 is less than 3%. This decrease is due to a lessor weight of steel in the main structural members and applies only to the mill price, since the costs for bracing, fabrication, erection, engineering, etc. remain practically constant for the three design loadings."

The tables show substructure and superstructure material quantities and costs under each of the three loadings for two steel bridges with spans of 140 ft. and 123 ft. respectively, and for a composite structure with spans of 35 ft. 3 in., 44 ft. 1 in., and 33 ft. 3 in. Comparisons of maximum bending moments under static, slow speed, and high speed loadings are presented in diagrams.

"Economics of Various Design Loadings" by E. E. Burch, R. C. Baker, E. F. Croxson, C. E. Ekberg, B. J. Minetti, C. A. Roberts, G. E. Robinson, L. L. Shirey, H. F. Smith, J. E. South, E. K. Timby, Committee on Assignment 11, American Railway Engineering Association, AMERICAN RAILWAY ENGINEERING BULLETIN, 50 E. Van Buren St., Chicago 5, Ill., January, 1956.

 Credit highway financing is being weighed in at least seven states this year to provide or continue accelerated highway construction programs.

Air Force Issues New Criteria for

Runway Design

Revised design will mean thicker sections, greater use of concrete. Also closer smoothness tolerances for fast-landing planes. Present program emphasizes heavy-duty installations.

I MPORTANT changes in airfield pavement and related design criteria are represented in a series of memorandums issued recently from Air Force Headquarters. The orders cover all new pavement including major repairs to existing surfaces. Based on studies of requirements for heavy jet planes, and of performance of existing pavements in service, the directive "establishes a new basis for design for heavy loaded pavement facilities."

Previously established design for light load pavement remains unchanged, but is restated for completeness.

The following is the wording of Memorandum No. IECM 56-34 (100.1.2) dated May 25, 1956, replacing AICM 55-54 (135.4.1) dated July 22, 1955, and IECM 56-8 (100,-1.1) dated January 18, 1956.

Pavement Type Selection

a. "Primary use pavement" at all Air Force installations, will normally be constructed of portland cement concrete.

b. The term "primary use pavement" is defined as (1) all paved areas on which aircraft are regularly parked, serviced, maintained or preflight checked; (2) all runways having adequate length, width and approaches to permit sustained use by combat or combat support aircraft, and (3) taxiways connecting paved areas defined in (1) and (2) above.

c. Other airfield pavement will be

c. Other airfield pavement will be constructed of either portland cement concrete or an acceptable type of bituminous pavement; choice being predicated on low first cost.

d. It is recognized that conditions will arise when construction with portland cement concrete may not be practical or economically feasible. Exceptions will be considered on request to Headquarters, USAF, attention: AFCIE-E.

e. All future actions on the part of the Air Force relating to programming authorization, funding, construction and reporting will clearly identify that the specific use of portland cement concrete pavement is intended where such is the case.

Basis of Design

Airfield pavement will be designed for either heavy load or light load conditions.

• Heavy Load. This design will be based on a gross aircraft load of 456,000 lb. supported on two (2) sets of "twin-twin" gear, each gear having a wheel spacing of 37" — 62" — 37", the tire on each wheel having a contact area of 267 sq. in. The load distribution on fore and aft gears is calculated on basis of 48% and 52%.

(1) Facility Design (a) Hanger access aprons, hangar floors, and Types A & B wash racks will be designed for partly empty, unarmed aircraft, weighing 300,000 lb. distributed 48% on fore and 52% on rear gear.

(b) Runways, taxiways, warm-up pads, parking aprons, maintenance aprons, heavy aircraft alert aprons and similar use areas (other than (1)

(a) (above) will be designed for an aircraft weight of 456,000 lb. In developing designs for aprons, 94% of the aircraft traffic will be assumed to weigh 400,000 lb. or less.

(c) The center third of the transverse width of primary taxiways, and the center 100 ft. transverse width of the end 500 ft. of runways and the connecting area will be designed for channelized traffic.

(2) Design Emphasis: All concerned, including Architect-Engineer firms retained for design, will emphasize that the major objective of this revised criteria is to resolve the problem of channelized traffic.

(3) Coordination of Special Designs. (a) Air Force design directives will identify pavements to be specially built for purposes not satisfied by the multi-mission criteria above.

(b) Pre-design conferences will insure proper justification of increased cost estimates for such special designs.

(c) Though no intermediate standard is established, special-purpose bases may be assigned design loads less than specified in paragraph 2a(1) above or 2b which follows.

• Light Load. A load of 25,000 lb. supported on a single landing gear having a single wheel having a tire contact area of approximately 100 sq. in

Design Selection

 Heavy Load Design. To provide flexibility for changing missions, heavy load design will be used for all airfield pavements at all Air Force installations except under the following conditions:

(1) Where terrain or previous base development would preclude the expansion of one or more essential runways for utilization by MB, HB or heavy cargo aircraft.

(2) At airfields not owned in fee by the USAF where terms of lease or base rights are inconsistent with extended Air Force tenure, or where agreements restrict operations to other than heavy aircraft.

(3) At permanently established basic training stations.

(4) At flying fields auxiliary to main bases.

(5) Fighter alert taxiways and other small or limited use facilities provided solely for fighter type aircraft.

(6) For extensions, additions or widenings made to existing understrength pavement which is not to be concurrently strengthened, the design of said increments will match the demonstrated strength of the existing pavement.

Next Month, Roads and Streets will present the first of a series of summaries of military airfield paving maintenance problems and procedures — as brought out at the recent conference on this subject held by the USAF installations leaders at Colorado Springs, Colorado.



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. . . for more details circle 231, page 16

Exception: Mass apron additions of 50,000 sq. yds or more will follow the criteria of 2a(1) (b) or 2b above. regardless of the strength of abutting

Additional Exception: The exception above does not apply to apronaccess taxiways or to other narrow peripheral additions to existing lowerstrength parking facilities.

Application of the heavy load design criteria pertains only to pavement strength and will not be construed as requiring additional lengths. widths or additional paved facilities not required by the assigned mission.

• Light Load Design. This design will be used for all airfield pavement to be constructed at all other Air Force installations where it will satisfy the mission requirements. Where additions or extensions are made to existing pavements which do not meet light load criteria, but are otherwise adequate for the assigned mission, the new pavement will be designed to match the strength of the existing pavement. Where existing pavements' are substandard or otherwise inadequate for the assigned mission they will be strengthened to light load criteria concurrently with the construction of the addition or extension. For Type C wash racks the load will be reduced to 20,000 lb.

Design Procedures

Pavement design will be based on procedures set forth in Part XII, Chapters 2 and 3 of the Corps of Engineers Engineering Manual or the Bureau of Yards and Docks (Navy) Airfield Payement Technical Publication, NAVDOCK TO-Pw-4.

Alternate Bid Schedules

On paving projects where other than portland cement concrete pavement must be considered, the contracting officer will evaluate control estimates for the total project. If, in his opinion, the use of all rigid pavement would not increase the project cost by more than 15 per cent alternate bid schedules will be offered. Otherwise, the project will be offered for bid with the flexible pavement items and the rigid pavement items clearly delineated.

Appurtenant Construction: This Installations Engineering Criteria Memorandum pertains only to pavement constructed specifically for the ground movement of aircraft. Criteria pertinent to stabilized shoulders, stabilized runway overruns and blast erosion

(Continued on page 90)



In Pennsylvania . . .

the Marsolino Construction Co., Uniontown, Pa., uses this ¾-yd. 22-B on turnpike extension work near Center Square. Quick-fill, easy-dump dipper and good maneuverability are two of many features that make the 22-B a profitable machine to own.



In Massachusetts . . .

S. J. Groves & Sons use this 4-yd. 88-B to load blasted rock for the Massachusetts Turnpike project near Blanford. The 88-B has a twin rope balanced crowd system that permits operator to obtain the most effective dipper speed when both hoist and crowd are needed — providing great digging force. All Bucyrus-Erie components are arranged for easy maintenance.



In Colorado . . .

this 38-B loads granular base material for state highway department on job near Monte Vista. The Pioneer Construction Company of Pueblo is the owner of this machine.



In Washington . . . this 1½-yd. 38-B cuts access road through wilderness of Olympic National Park for Bureau of Public Roads. Machine is owned by Hugh Govan, Port Angeles. Heaped dippers and fast cycles make Bucyrus-Eries ideal for road construction work.

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Wherever Bucyrus-Eries work they are standouts for high output and dependable, long-life service. Such performance on the job results from close attention to quality in the factory, where research and design, testing and manufacturing aim for perfection in every detail.

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In Georgia . . .

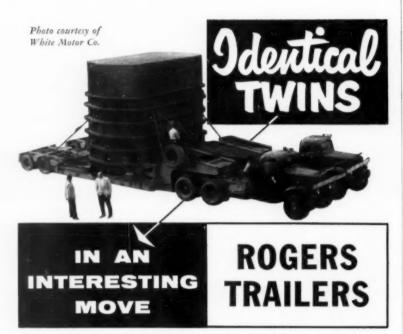
this ½-yd. 15-B digs fill near Flintstone for state highway department. Fewer parts, anti-friction bearings, superior materials, and careful coordination of working parts puts every pound of weight to work . . . makes the 15-B most efficient in its size range. The machine pictured is owned by W. J. Coulter, St. Elmo, Tennessee.



In Kentucky . . .

this 3-yd. 71-B loads trucks at one stretch of the Kentucky Turnpike. Its owner is Traylor Brothers Contracting Co., Evansville, Ind. Power and coordination to handle heavy rocks smoothly and efficiently make the 71-B truly a "big league" performer.

or more details circle 189, page 16



Two identical Rogers Trailers — two identical White trucks — plus know how of the Duke Power Co., Spartansburg, S. C., gained by long experience, made practical the handling of this 150 ton transformer with comparative ease.

Each 50 ton trailer, generally used separately in moving various and sundry heavy loads, co-operated in handling its half of the 150-ton transformer.

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PERFORMANCE



Divided bed, tilt deck trailer with gooseneck.

. . . for more details circle 238, page 16

Air Force's New Criteria

(Continued from page 88)

control features are contained in separate memoranda.

Implementation: (Mandatory), The above mandatory criteria will be integrated into current and future programs subject to the following:

a. FY 57 and future year program items will be designed in accord with above criteria.

b. Above criteria will be used in design of FY 56 and prior year items where construction has not progressed to such a point as to make application impractical.

When implementation of above criteria to FY 56 and prior year program items will require additional apportionment of funds or will jeopardise funding of other facilities in the same program details will be referred to AFCIE-C prior to implementation.

Channelized Traffic Areas

The following is from Memorandum 56-35 (100.1.3) Dated May 25, 1956:

Tracking of modern aircraft during ground movement is confined to a relatively narrow path. The resulting concentration and channelization of traffic requires special design considerations for those areas affected. Channelized areas of airfield pavement are designed as follows:

a. The center 100-ft. width for 500-ft. length at each end of all runways.

 The center 25-ft. lane of all primary taxiways, as defined in above referenced IECM.

c. Full width of all primary taxiways adjacent to warm-up pads and runway ends and around curves for the distance "A" beyond the P. T.

2. Areas NOT designed for channelized traffic are (a) Sides along the first 500 ft. of runway ends, except for connections with channelized taxiways; (b) Second 500 ft. of runway ends; a (c) Runway interiors; (d) All alert and secondary taxiways; (e) Sides of all primary taxiways, except where designated otherwise in paragraph 1c above; (f) Aprons, except for primary taxiways; (g) All areas of light load pavements; and (h) All other airfield pavements that are not otherwise specified to be designed for channelized traffic.

1. The above mandatory criteria will be integrated into current and future construction programs subject to certain stated conditions.

(Continued on page 92)



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for more details circle 263, page 16

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for more details circle 177, page 16

Air Force's Criteria

(Continued from page 90)

Stabilized Runway Overrun

The following is from Memorandum No. 56-37 (125.1.1) dated May 25, 1956, rescinding a governing memo dated November 18, 1955.

Stabilized overruns will have a width equal to that of the runway, exclusive of shoulder stabilization, and a length of 1,000 ft., where feasible, measured from the runway end. Stabilization will consist of a double bituminous surface treatment applied to a base and sub-base designed in accordance with Air Force heavy load design criteria for runways (456,000 lb. gross aircraft load on two twintwin gear assemblies, the load being distributed 42% - 52% fore and aft respectively) for emergency utilization. The total thickness required will be determined from the appropriate flexible pavement curve developed by the Corps of Engineers or in accordance with the procedure prescribed by Bureau of Yards and Docks (Navy).

Where the strength of the existing blast pads within an overrun area is reasonably consistent with strength of the stabilized overrun specified above, such pads will be left intact. In those instances where the strength of existing blast pads is not reasonably consistent, the pads shall be removed and replaced as a part of the runway overrun construction, after which the pads (areas equal to the width of runway x 150 ft.) will be surfaced with two-inch hot-plant-mix asphaltie concrete, in accordance with current blast pad criteria.

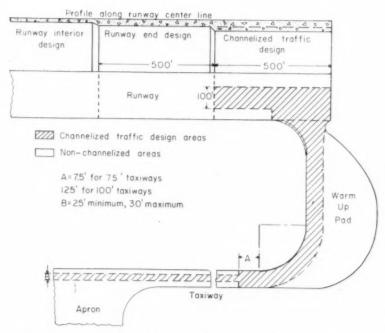
These mandatory criteria for overrun areas will be integrated into current and future construction programs subject to certain conditions.

Pavement Grade Control

The following is from Memorandum 56-36 (100.1.4) dated May 25, 1956:

It is normal practice to require airfield pavements to be constructed to line and grade as shown on the construction drawings. Recognizing, however, that it is difficult to obtain and maintain true grade with current construction equipment, some deviation from the established grade is generally permitted. In numerous cases the deviation has been found to be excessive. When such conditions exist or are permitted, operation of modern high speed jet aircraft is seriously affected.

All finished airfield pavements shall conform to the following require-



 How and where channelizing by heavy planes will require heavier pavement thickness under the new Air Force criteria for heavy loading pavement.

Finished surfaces shall conform with the lines, grades, cross sections and dimensions shown on the contract drawings. In the event the work obtained varies from the grade line or elevation shown on the contract drawings in excess of 0.04 ft., the contractor will be required to correct or remove and replace the defective work at no expense to the Government.

Skin patching for correcting low spots will not be permitted. Where greater accuracy is required in any airfield pavement area for the proper functioning of any appurtenant and contiguous structure, the above deviations from established grade line or elevation will not be permitted.

The finished surfaces of all airfield pavements shall be tested for trueness using approved straight edges 16 ft. in length, except straight edges 10 ft. in length may be used on vertical curves. The straight edges shall be held in contact with the surface and the whole area covered as necessary to detect surface irregularities in excess of the tolerances specified hereinafter.

(a) Any portion of a portland cement concrete pavement which shows a variation greater than % in. from the testing edge of an approved straight edge shall be corrected by the use of a power grinding machine or removed and replaced as directed by the contracting officer without additional cost to the Government.

(b) Any portion of a leveling or binder course of a flexible type airfield pavement which shows a variation greater than ½ in. from the testing edge of an approved straight edge and any portion of surface course of a flexible type airfield pavement which shows a variation in excess of ½ in. from the testing edge of an approved straight edge shall be corrected by removing the defective work and replacing with new materials as directed by the contracting officer without additional cost to the Government.

Big striping contract

An Indianapolis firm, Barker Brothers, Inc., was awarded an \$80,654.50 contract recently for the painting of traffic guide lines on the Northern Indiana Toll Road.

The contract provides for 120 gal. of yellow paint; 15,850 gal. of white paint and 95,820 lb. of glass reflectorizing beads.

Two Down and 10,000 Old Bridges to Go!

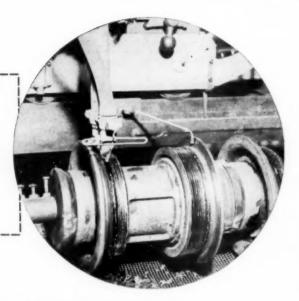




• In one week-end recently these two bridges gave up the ghost under traffic. (At left): Old truss near Graf, Iowa, collapsed when motorist struck one of the structural members. (At right): Two cars were on this bridge when it dropped into the creek, hospitalizing six persons. Again a structural member was side-swiped. (United Press Photos.)

Does it pay to

REBUILD TRACTOR **ROLLERS?**



here's one answer...

This is a report from one of the country's largest tractor maintenance shops having complete facilities for crawler reconditioning. It particularly concerns rebuilt track rollers, a major item of wear. In this shop rollers are regularly rebuilt and hard-faced by the automatic electric welding process, using Stoody 105 on the running surface and flange.

About a year ago a tractor came into the shop for overhaul. The rollers were badly worn; those found suitable for rebuilding were returned to size with Stoody 105 and the internal assemblies thoroughly reconditioned. The balance of the rollers were discarded and replaced with standard parts. Following routine procedure, the shop foreman checked the entire crawler assembly to insure proper alignment—a highly important factor in reducing needless near. After 2500 hours this tractor came in again for its customary overhaul. Inspection of the rollers disclosed the following:

The standard rollers, without exception, were worn from 3/8" to 1/2" on the running faces; in all cases the internal assemblies required several replacement parts.

Hard-faced rollers showed negligible wear on running surfaces and the only replacements needed were new seals for internal assembly.

It is of course an accepted fact that rollers rebuilt and hard-faced with Stoody 105 by the automatic method give a service life considerably beyond that of standard replacements-at a much lower cost. The hard-faced roller with its superior abrasion resistance reduces uneven wear on the track rails by providing a smooth, even working surface that allows free movement of the rails and resists grooving of the roller. Hence, wear on the internal roller assembly is also decreased.

Stoody 105, the alloy used in this application, was the first automatic wire of its type and is today the alloy generally preferred by principal shops. It has been proven by eight years of actual field use-assurance of maximum service life at reasonable cost.

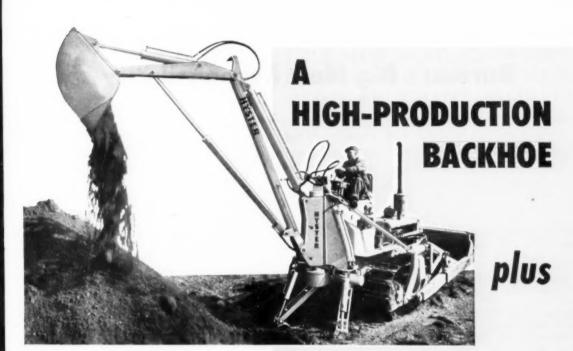
Earth-moving contractors operating large fleets of tractors, shovels, buckets and crushing plants often find the installation of an automatic welding head a profitable investment for rebuilding rollers, idlers, house rolls, crusher rolls and similar wearing parts. Many contractors, however, prefer to send such work to a thoroughly equipped automatic job welding shop of which there are a number located throughout the country. A list of these job shops is available on request.

Complete information on automatic hard-facing installations and procedures will gladly be supplied-without obligation. You may consult your local Stoody dealersee the "yellow pages" of your phone book under "Welding Equipment and Supplies"-or write direct.

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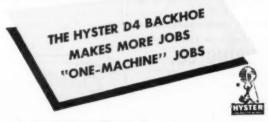
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One machine does all these jobs:

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ROADS AND STREETS, July, 1956

Preview of the

Bureau's Big New Responsibility

Decentralized administration with minimum red tape is the key to BPR's management philosophy for an expanded federal-aid highway program. Chief concern is over relocation policies for the Interstate System.

By Duane L. Cronk

Washington Editor, ROADS AND STREETS

THE job of administering the new multi-billion-dollar National Highway Program will fall to the Bureau of Public Roads. Out in the states, some questions arise: "How will the Bureau handle the tremendous job cut out for it?" — "Will the federal agency, because of the national government's major share in the cost of the Interstate System, seek more control over roadbuilding?" and "Will Interstate projects be wound in red tape?"

C. D. Curtiss, commissioner of public roads, answered some of these questions for Roads and Streets last month. Categorically, he said:

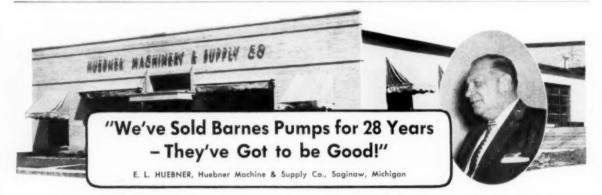
"BLUEPRINT" — Continuing a series of reports on the impact of proposed federal highway legislation, which began with a 19 page special "Blueprint for An Expanded Road Program" in your June issue. Other topics announced in June will follow in succeeding issues.

"Yes, we will be able to handle the job; we are now studying where we will need to expand for that purpose. No, the federal government is not going to usurp any more control over the way the state highway departments build the Interstate roads. And, as a matter of policy, we intend to cut paperwork to a practicable minimum."

aperwork to a practicable minimum."

The agency is required by law to

represent the interest of the federal government on jobs where federal aid is applied. This will be particularly true on the big jobs in the National Interstate System. Here, where 90% to 95% of the cost will be borne by Uncle Sam, minimum and uniform design standards must be established and the routes be dictated in the interests of through traffic as well as local needs.



"The courteous treatment that Barnes has always extended to us and our customers, plus the fine satisfactory performance of Barnes Pumps, certainly indicates that Barnes Pumps are the best, and Barnes as a company, is the best too.

"When you continue to sell one line of pumps for 28 years and see customer acceptance of Barnes Pumps grow steadily year-after-year—when old customers come back for another Barnes Pump and new customers ask for Barnes Pumps—you can be sure that you are handling the best pumps made."

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forward action in 56



. . . for more details circle 186, page 16

ROADS AND STREETS, July, 1956

But, Commissioner Curtiss pointed out, the ground rules will be flexible enough to permit the same relationship which the bureau now enjoys with the state highway departments, a scheme in which the states have prime responsibility for location, design and construction.

"The historic policy of states initiating construction according to their needs and the Bureau approving these projects on the basis of sound system planning has provided the nation with a fine network of highways. This division of responsibility ought to work just as well for the construction of the National Interstate System," he believes.

Furthermore, Mr. Curtiss said, bureau operations will be modified to back up that policy. The Washington agency will continue to shift responsibility to the field offices where state highway department officials can expect faster decisions than a few years ago when almost everything went to Washington. District engineers are better acquainted with the problems of the various states and the local conditions that affect engineering judgments. This on-the-spot experience and the closer liaison is bound to minimize snarls and cut lead time somewhat.

In line with this purpose, most of the staff increases the bureau contemplates will be made in the field forces. Of the bureau's staff of 3,100, about 2,200 operate in and out of the agency's 9 division and 52 district offices. The BPR has 1,100 professional engineers now, and will undoubtedly take on more.

"But there's no use talking about how many we need for the big program; the question is — 'How many can we get'?" one official said.

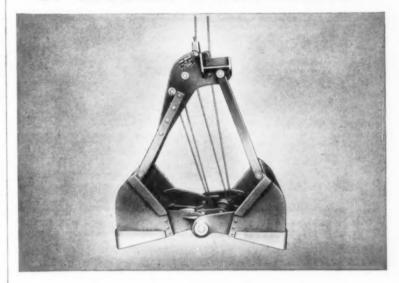
The bureau wanted to recruit 45 college graduate engineers last spring; it got 30.

Bureau on Spot

Not only will much of the paperwork be processed in the field; some will be eliminated entirely. An example of this is in the Secondary Road Plan, where in lieu of reviewing the plans and inspecting the job during construction, the bureau can now accept a certification from the state that the project will be built to the state's current standards. Thirty-seven states are operating under the plan already. The result has been significant manpower savings in the bureau.

Two other provisions in the new law are expected to give the bureau somewhat more of a problem. One is to insure construction of the National Interstate System to the high standards envisioned by its designers. It ATTENTION . . . Lightweight Crane Owners

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These features make ERIE the bucket experienced operators prefer:

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Makers of Light, Standard and Wide Rehandlers, General Purpose, Heavy Duty, Extra Heavy Duty, Electric and Mechanical Clamshells. is true that the association of state highways officials drafted design criteria for the 40,000-mile network. But the bureau knows that individual states may have difficulty maintaining these decisions. State officials will be subjected to considerable pressure for exceptions, some of which will

be hard to resist. In such cases, they will most likely fall back on the bureau and the Washington agency will be on the spot to make the painful decision.

Commissioner Curtiss anticipates that most such problems will involve control of access. He feels strongly about the importance of preserving highway investment by this device.

There was a time when highways were built solely to serve the property owners along the way. No one traveled far and the local access wherever it occurred was proper. Then, with the coming of the automobile, we saw truckers and tourists using these piecemeal roads for long trips. So the roads served not only the needs of the property owners adjoining but the needs of through traffic. Today, however, we have found it necessary to design for motorists and truckers who are traveling great distances and who have no interest in frequent access along the way. To expedite such traffic, and to preserve the traffic capacity for heavy local traffic as well, the highways must be designed with control of access

"We do this by carrying all cross traffic overhead or underneath the main route, by by-passing the towns, and by controlling the method and

places of access.

"John O'Brien, highway editor of the Hearst newspapers, calls this 'planned access' rather than 'controlled access' and he is right. We need to plan access on the National Interstate System so the highway will be safe and fast for the majority of people who will use it.

"If the state highway departments can get that idea across to their people, we won't have as many embarrassing decisions to make in Washington in the months ahead," he said.

Helping the States with Right-of-Way

The bureau contemplates some expansion in its right-of-way force. The highway program provides that a good-sized sum of federal funds will be available to the states for land acquisition. The high cost of property is expected to force many states to take advantage of this provision. Also, federal funds may be used to pay for up to 90% of the cost of property needed for the Interstate System, which may put the bureau as deep in the approval of right-of-way deals as it currently is in the inspection of construction.

Another provision of the new federal law makes it possible for states to appeal to the federal government to acquire right-of-way it is having trouble obtaining for Interstate jobs. This is a wise clause, Commissioner Curtiss feels, but if the states were to take unusual advantage of it, the bureau would have a real chore on its hands. States that don't have adequate land purchase laws would do well to develop the legal tools they need to ac(Continued on page 107)



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with these BIG NEW FEATURES

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Many new features added to the ruggedness and stamina of the original Junior Tandem make this time-tested "workhorse of the Iowa line" a more versatile plant, with greater capacity and lower maintenance.

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Whatever your pit conditions, you can meet crushing requirements right on the nose! With high crushing percentages, use the $10^{\prime\prime}$ x $36^{\prime\prime}$ jaw crusher for extra primary capacity. In average conditions, choose the 10" x 24" jaw crusher. Meet normal secondary reduction requirements with a $24'' \times 16''$ roll crusher, or where percentages of fines are high, use the $30'' \times 18''$ roll crusher. Mix 'em and match 'em for balanced production on your job!

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, for more details circle 224, page 16

New Publications

Excavation methods book

"Modern Techniques of Excavation," by Herbert L. Nichols, Jr., is the title of a new book published by North Castle Books, 212 Bedford Road, Greenwich, Connecticut. Priced at \$9.00, this volume represents an abridgment of a former book entitled, "Moving the Earth."

The new book includes all eleven chapters of the former volume plus a new section analyzing present-day equipment and an additional chapter on maintenance hints for equipment owners; also an appendix and glos-

Data are included on such subjects as blasting, drilling, bulldozing, clearing, compressed air and tools, conveyor belts and buckets, and some two score additional topics.

Mix design methods for hot-mix asphalt paving

(Manual Series No. 2). A new 168 pp. pocket-size manual published by the Asphalt Institute containing authoritative information and instruction for the design of mixes by the Marshall, Hveem, Hubbard-Field and Smith Triaxial test methods. Test procedure and interpretation of test data are provided for each mix design method. Appendices include information on the gradation analysis of aggregates and the density and voids analysis of compacted paving mixtures. Price \$1.00. Write: The Asphalt Institute, College Park, Maryland.

Quarry Safety Methods

A manual entitled "Safety Procedures For Quarries" has been published by the American Standards Association. Sponsored by the National Safety Council the manual is intended as a guide to aid not only in quarry operation but in the manufacture and purchase of better equipment and products involved in quarry operation. For a copy please address American Standards Association, 70 East 45th Street, New York 17, N. Y. price \$1.50.

"Resistance of Materials"

A major revision of "Resistance of Materials" as a fourth edition has been issued by John Wiley & Sons, 440 Fourth Avenue, New York 16. N. Y. Written by Fred B. Seely and James O. Smith, this text is in its thirty-first year, completely modernized.

The traditional treatment of the subject, based on the assumption of elasticity, has been extended to include the effects of inelastic behavior on the strength of a member. New chapters have been added on torsion of cylindrical bars; bending loads and stresses in beams; deflection of beams; combined axial tensile loads; statistically indeterminate members; and numerous other subjects. Price of this 459 page volume, \$6.50.

Maintaining unpaved roads

The Calcium Chloride Institute has prepared a handy size, 36 page maintenance booklet "Maintenance Tips for Unpaved Roads." It was written to help patrolmen, maintenance supervisors, and engineers obtain best results from the use of calcium chloride on unpaved roads. Sections deal with the various maintenance operations and specific questions and tables are included. The information presented is designed to produce maintenance procedures which will prove most helpful in upgrading maintenance of unpaved roads.

The Institute's experience shows



44

that proper use of calcium chloride saves up to 75% of the aggregate replacement and blading costs, and gives a dustfree, smooth-riding surface. For a free copy of "Maintenance Tips for Unpaved Roads," write directly to the Calcium Chloride Institute, 909 Ring Building, Washington 6, D. C.

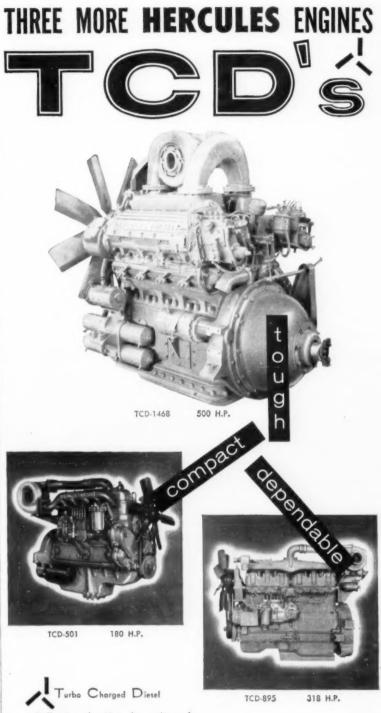
Problem of Service Facilities on Controlled-Access Highways. This special report by the Research Department of National Highway Users Conference discusses a vital aspect of the location and design of interstate and other limited access facilities. For free copy, write N.H.U.C. at 966 National Press Building, Washington 4, D. C.

STATISTICAL ANALYSIS OF HIGHWAY ACCIDENTS. Bulletin 117 of the Highway Research Board. Contains two papers presented at the 34th annual meeting of the Board: (1) "Accidents Versus Width of Paved Shoulders on California Two-Lane Tangents — 1951 and 1952," by D. M. Belmont; based on the statistical analysis of 771 injury accidents which occurred in 1,122 road sections each 1 mile in length. It was found that the accident rate tended to increase with shoulder width, except at traffic volumes below about 2,000 vehicles per day.

(2) "Application of Statistical Quality-Control Techniques to the Analysis of Highway-Accident Data," is by Monroe Norden, Jesse Orlansky, and Herbert Jacobs. Reviews current techniques for study of accidents and points out their advantages and disadvantages. Presents the development of statistical control techniques, together with the results of a pilot application of these techniques to an actual highway situation. The results show strong promise that the application of this method can contribute substantially to the highway accident problem.

Price of bulletin \$0.75, remitted to Highway Research Board, 2101 Constitution Ave., Washington, D. C.

MIX DESIGN METHODS FOR HOTMIX ASPHALT PAVING (Manual Series No. 2). A new 168 pp. pocket-size manual published by The Asphalt Institute containing authoritative information and instruction for the design of mixes by the Marshall, Hveem, Hubbard-Field and Smith Triaxial test methods. Test procedure and interpretation of test data are provided for each mix design method. Appendices include information on the gradation analysis of aggregates and the density and voids analysis of compacted paving mixtures. Price \$1.00. Write: The Asphalt Institute, College Park, Maryland.



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. . . for more details circle 216, page 16

Personals

BURTON MARYE, JR., former chief engineer and career man with the Virginia department of highways, and recently general manager of the Richmond-Petersburg Turnpike Authority in that state, died May 9 in Richmond. Mr. Marye's traffic studies gained him a national reputation. He supervised preparation of a 20-year plan for Virginia highways.

J. J. CORBETT, construction engineer of the Missouri State Highway Department, has advanced to assistant chief engineer. He succeeds P. H. Daniells who has retired from that position after 11 years.

Other promotions in a shift related to these appointments: Dean Wilson, formerly engineer of maintenance, goes to the newly-created post of assistant to the chief engineer; Charles C. Tevis, district engineer at Kirkwood becomes engineer of construction at headquarters; L. M. Hoskins succeeds Wilson as engineer of maintenance; Richard A. Currie succeeds Tevis as district engineer at Joplin; W. J. Eddleman becomes district engineer at Joplin; Marvin J. Snyder, district engineer at Kansas City.

FRED EPPS, bridge authority and long-time career man with the Kansas Highway Commission, has retired after 54 years in civil engineering. Mr. Epps served more than 30 years with the commission, his work including for a considerable time the position of Maintenance Bridge Engineer.

Cement association changes

The Portland Cement Association has announced organization changes in the Chicago General Headquarters staff of its Promotion Division, headed by vice-president James D. Piper. The purpose is to broaden responsibility for the organization's expanded promotion program. The former position of Director of Promotion has been divided by the creation of the positions of Director of Promotion Planning and Engineering Services, and Director of Educational Services.

The position of Director of Educational Services will be filled by Charles W. Reene, 33, formerly Advertising and Promotion Manager for Hough Manufacturing Corporation. He will supervise advertising, public relations, publications and educational films

Leo H. Corning, prominent in the structural engineering profession, is given the new title of Director of Pro-

Edward W. Kilpatrick



 Edward W. Kilpatrick, recently retired as chief highway engineer of New Jersey, has been named consulting engineer to the Boswell Engineering Co. of Ridgefield Park, N.J.

motion Planning and Engineering Services, in which position he will be able to devote full time to the requirements of technical promotion.

George H. Paris, formerly Assistant Director of Promotion, appointed Assist. to the Vice Pres. for Promotion.

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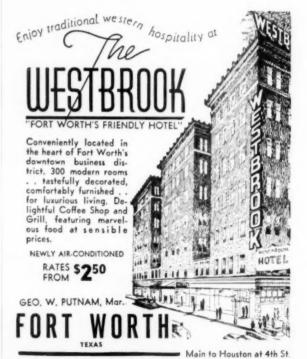
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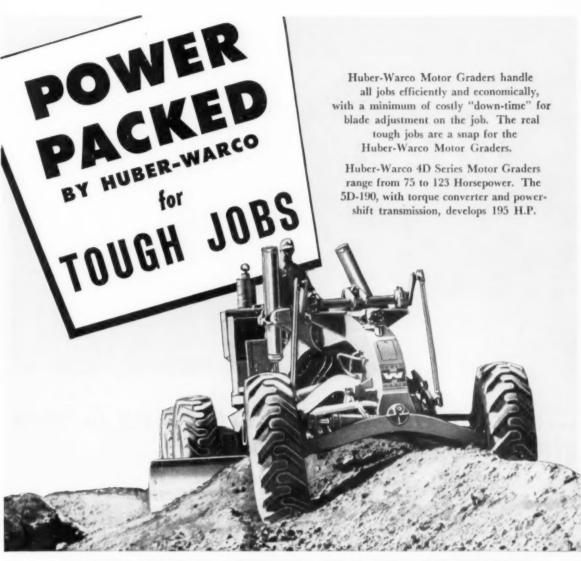
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- Completely cab-controlled blade movement, 90° either side—no manual adjustments.
- Mechanical steering with hydraulic booster.
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for more details circle 220, page 16

ROADS AND STREETS, July, 1956



"...started with a rented CLEVELAND in 1949 ...now we own ten"

SO SAYS HUBERT S. ELEY, vice president and general superintendent of D. A. Foster Trenching Corp., of Merrifield, Va. Today the firm, employing about 200 men in the field, keeps its 10 Clevelands (Models 95, 110 and 140), constantly busy on trenching jobs of all kinds. Further excerpts from Mr. Eley's report:

"...we encounter all types of soils and terrain...
swamps, sand, rock, shale, clay...stumps,
boulders and other obstructions...hill and flatland...our Clevelands dig them all."

"... we dig a gas or water house-connection in 15-20 minutes with one of our Clevelands."

"... on building footings we dig 1,800-2,000 feet of 30" deep trench per day with a Cleveland."

"... not necessary to stockpile large amounts of parts for Clevelands."

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Clevelands operate a working week on a tank of fuel,"

".. our Cleveland 140 paid for itself within 30 days."

"...one of the many reasons we prefer Clevelands is their all-around adaptability ... besides our utilities work and footings contracts we use them for drainage trenching, septic tank installations and a wide range of other applications."

"...we consider Clevelands the best all-purpose trenchers made...the easiest to operate...and the longest lasting."



THE CLEVELAND TRENCHER COMPANY

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. . . for more details circle 196, page 16

Technical Digest

By John C. Black

A study of tendons in pre-tensioned concrete

Studies covered 0.196-in, smooth wire, 0.276-in. deformed wire, and 7-wire strand in diameters from ¼ in. to ½ in. The synopsis is as follows:

The use of a few large tendons in pre-tensioned concrete construction, instead of many small ones, cuts field costs and simplifies design. This is especially true for heavy members.

Physical properties of tendons are tabulated for average plant-produced steels based on stress-relieved and asdrawn material. Precautions and tests for evaluating tendons are discussed.

It is shown that the bond in the end zones of a pre-tensioned member differs from the bond in the interior zones. Both types of bond can be determined by a curve indicating the maximum tension which can be absorbed in a tendon, without slip, at various distances from the end of a member. Methods of determining such curves or part thereof are explained.

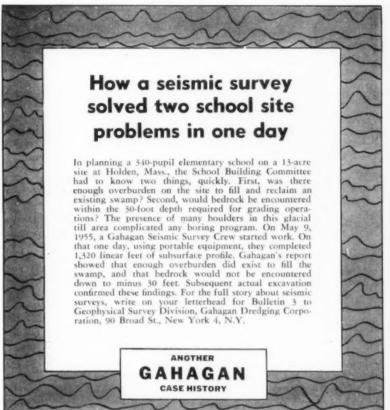
"When using large tendons, secondary stresses in end zones of pre-tensioned members become important and may cause cracking if special care is not taken in the design. The use of a few general rules to prevent such cracks are indicated.

"A few examples of practical applications of large tendons are described. Some future possibilities are discussed such as the use of bond breaking devices in end zones of pre-tensioned members and curved tendons.

"Use of Large Tendons in Pre-Tensioned Concrete" by Niels Thorsen, Engineer, Monberg & Thorsen, Copenhagen, Denmark. (Formerly Chief Engineer, Freyssinet Co., Inc., New York), JOURNAL OF THE AMERI-CAN CONCRETE INSTITUTE, 18263 W. McNichols Rd., Detroit 19, Michigan, February, 1956. Price \$1.50 per copy.

Surface texture of aggregate particles

"A method has been developed for measuring quantitatively the surface texture of particles of concrete aggregate. Various possibilities were considered; the method adopted involves embedding a particle of aggregate in a synthetic resin and obtaining thin sections of the aggregate surrounded by the resin. The interface between stone and resin is magnified 125 times on a projection microscope and trac-



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and 5KW OUTPUT per pound of weight! MORE OUTPUT per gallon of fuel! MORE OUTPUT per dollar cost!

Way ahead in performance and value! More powerful, two-cylinder, air cooled Onan gasoline engines of 4-cycle, horizontally-opposed design give smooth, quieter, effortless performance. Short stroke and moderate speed cut engine wear, give longer life. Quality features include rotating Stellitefaced exhaust valves, solid Stellite valve seat in-serts, full pressure lubrication. Onan's exclusive Vacu-Flo cooling system available for difficult or "buried" installations.

Completely Onan-built, with Onan gasoline engines direct-connected to Onan all-climate generators in compact, rugged units. Available in stationary, portable and standby models with a wide range of accessories.

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ed. The length of the profile obtained is measured by means of a map-measuring wheel and compared with the length of an unevenness line drawn as a series of chords. The difference between the two lengths is taken as a measure of the roughness.

"The reproducibility of the results is good but the variation between different parts of a stone is large. Thus it is necessary to obtain a considerable number of results in order to give a reliable average. This is largely because of the smallness of the sample length: one-tenth of an inch. The method has been used to compare the roughness of a series of 12 different aggregates.

"It has long been recognized that the surface texture of a particle of aggregate might be an important property in determining the adhesion of binders to its surface. The degree of adhesion might, in turn, be expected to influence the properties of the mix.

"Difficulty has been encountered in assessing the surface texture quantitatively, and although several methods have been developed to some degree, none has so far been generally accepted or widely used. The method described in this article was developed at the Road Research Library as part of an investigation into the effect

of the physical characteristics of aggregates on the properties of concrete made with them."

Photographic illustrations, line drawings, diagrams and tables are included.

"A Method of Measuring the Surface Texture of Aggregate" by P. J. F. Wright, Magazine of Concrete Research, Cement and Concrete Association, 52 Grosvenor Gardens, London, S. W. 1, England, November, 1955.

Traffic crisis expected into Chicago southside area

Much concern is being expressed over the traffic jam-up that is certain to develop when the Indiana Turnpike is completed late in the present Summer. This turnpike will terminate at the state line between Gary and Chicago, at 106th Street and Indianapolis Avenue. This spot is already heavily congested and dreaded by motorists and truckers.

Chicago and Cook County have a completed expressway originally intended to tie in with arterial traffic headed around the Lake, namely, the Calumet Expressway. But this facility is far to the south of the terminal of the tumpike.

To connect up with this terminal, the city of Chicago is pushing construction plans for the \$88,000,000 elevated toll Calumet Skyway which will lead from the Indiana Turnpike into Chicago's south side, but this structure cannot be completed until 1959. Work on the approaches to the Skyway will probably further complicate the traffic flow at the state line during construction.

Other headaches that may further accentuate this traffic "mess" include the delay in completion of the new bridge over the Calumet River at 95th Street (due to slow steel deliveries); and the existence of crossings at the grade of the Illinois Central suburban tracks at 71st Street and Stony Island, along the four-lane divided facility that is expected to carry the chief load into downtown Chicago pending the Skyway's completion.

According to a recent Chicago newspaper account, various alternate plans are being hastily considered by Illinois and city officials, but no definite plans have been announced. The state is considering several grade separations which will also take time to build, and a wide boulevard through Jackson Park cutting across into the Outer Drive toward the "Loop."



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CONCRETE AND MASONRY CUTTING BLADE DIVISION

DIAMOND TOOL CORP.

The Bureau's New Responsibility

(Continued from page 98)

quire right-of-way themselves, Mr. Curtiss believes. The bureau is not eager to get into the real estate business.

Congress has expressed a great deal of confidence in the Bureau of Public Roads throughout the years. In return, the bureau has leaned over backwards to respect "state's rights." The National Highway Program involves the federal government in highway financing and construction to a proportion far greater than ever before, and the character of the National Interstate System, particularly, will require firm federal coordination.

Even so, no one in Washington seems concerned that the bureau will overstep the bounds so jealously regarded by state highway officials. As way Officials, and the Highway Research Board, to determine what limitations should be placed on sizes and weights of vehicles using the federal-aid highways.

 A study to determine how the tax burden should be distributed among the various classes of highway users, depending upon the benefits they derive and the proportionate share of design, construction and maintenance costs attributable to each.

There is plenty of ammunition for state highway officials to use in their campaigns to obtain public support for control of access, Mr. Curtiss pointed out. "You just can't argue against the safety records established on 'planned access' highways," he said. "The fatality rate on all of California's heavily traveled freeways is only 1.9 per 100 million vehicle-miles, compared to 8.4 on her rural state highways. The fatality rate on Chicago's



C. D. Curtiss

ations for its own activities. In 1955, this amounted to \$32 million of which, by careful budgeting the agency used only half however.

Wise personnel policies and stable working conditions have given the agency a reputation of a good place to work. Whereas many government organizations lose up to 40% of their professional personnel yearly, the bureau's turnover is a low 10% or less.

How Uncle Sam's Share will Grow

Effect of federal aid on total highway construction, selected years.

	Total Construction	Federal Portion	Percentage
1921	\$ 840 million	\$ 87 million	10.4%
1931	\$1,323 million	\$242 million	17 %
1938	\$1,642 million	\$999 million	61 %
1954	\$3,856 million	\$525 million	23 %
1957	\$ 7 billion (est'd)	\$ 2 billion	29 %

Commissioner Curtiss puts it, "Highway development in this country has gone far under the partnership philosophy of letting the states initiate and construct the roads with federal aid and coordination. I don't see any need to forsake that proven procedure now."

Congress handed the Bureau of Public Roads several comprehensive research projects in the new federalaid law — some in very controversial areas — including:

- A study of already constructed highways on the Interstate System which meet System standards and how much of their cost the states involved should be reimbursed.
- A study of the estimated cost to complete the National Interstate System within the various states.
- A study of the causes of automobile accidents and what role the federal government should take to reduce the hazards on the highways.
- A study, in cooperation with the American Association of State High-

Edens Expressway is 2.3, compared to 11.1 on parallel U. S. 41. That's part of the story we need to tell."

Some idea of the BPR's operation may be seen in its annual budget. Congress authorizes the bureau to retain 3%% of the federal-aid appropri-

Flood housing offered to families in turnpike path

One hundred and fifty portable houses which had given shelter to refugees from last autumn's floods were offered for rehousing families who will be dispossessed to clear for the Connecticut Turnpike.

The offer was made by Governor Ribicoff of Connecticut and Mayor Quigley of Stamford. The houses which are presently stored are said to be worth about \$6000 each, and of better quality than Quonsets. The buildings are transportable by trailer.

Some of the Chief Policy Questions

What's involved in the National Highway Program for the Bureau of Public Roads?

The task of apportioning billions of dollars on a scandal-free basis, inspecting thousands of projects, completing several comprehensive research projects, defending Interstate System standards, and approving numerous right-of-way takings.

Will the 90-10 Formula on the Interstate System upset the historic federal-state relationship?

"No," says Commissioner Curtiss. The existing division of responsibility that has developed other systems will work equally well for construction of the big, new 40,000 mile Interstate network.

How does the Bureau plan to cut red tape to keep the jobs moving?

By decentralizing, processing the paperwork in the field, giving district engineers more responsibility and building up field forces. Also, by eliminating some report work entirely.

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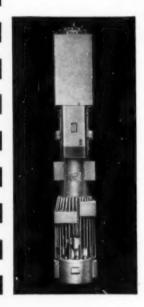


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Gasoline Hammer PAVING BREAKER

Rugged, economical, 100% self-contained unit. No air compresser needed. Easily portable—one-man operation. 2,000 powerful blows per minute, governor controlled—no air compressor, hose or batteries.



All Syntron self-contained power tools are known for their portability, power and rugged construction. This adds up to long dependable service on job after job with little or no maintenance.

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. . for more details circle 249, page 16

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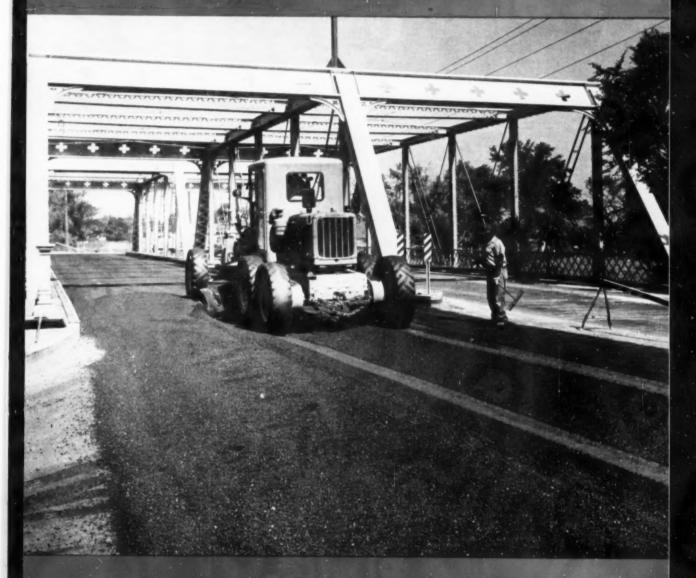
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ROADS AND STREETS, July, 1956

BRUMINOUS. ROADS AND STREETS



A 2½-in, course of dense-graded hot applicatic min is being "tail-pared" and spread on approaches to the 36th Street Bridge, Denver, Colo, Hot min was previously applied over steel fabric on the wood ducking of the bridge. Tack cost proceeded application of hot min. Two-way traffic is maintained on other double readway bridge.

Published by Gillette Publishing Company 22 West Maple Street, Chicago 10, Illinois

Use of Lightweight Mineral Filler In Louisiana
Latest Developments in Equipment and Materials

IIII V 1056

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CAR No. NET WT. L. & N. 21396 40,000 lbs. N. & W. 32813 71,600 lbs. P. R. R. 342731 40,700 lbs. Southern 315769 27,900 lbs. Southern 408008 47,400 lbs. S. P. 142668 17,400 lbs. N. Y. C. 638445 34,300 lbs.

Total 279,300 lbs.
Sales Price
of Plant \$114,503.00

price per pound

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VIEWS AND COMMENTS

By H. G. Nevitt

Volatile Control in Mixing

Part I: The Situation

OUR previous discussion of volatiles in asphalt pointed out that two distinct controls seem required. The first is in the mixing; the asphalt selection and requirements must be such that the binder in the completed mat is at the required optimum condition. The second concerns the durability of this asphalt in the mat; its further changes after the modifications occurring during mixing must be so limited that undue hardening does not occur during the design life of the pavement. This discussion is devoted to the mixing phase.

voted to the mixing phase.

It is critical to note that the asphalt characteristics of primary interest are those following the mixing and laying operations, rather than those of the asphalt as purchased. Provided such is feasible for routine control, these later properties could alone be specified, leaving it to the contractor to purchase material of any type that would result in the required binder after acceptable construction methods. Only to the extent that practical requirements demand it should the initial asphalt properties be regulated, along with the mixing procedures that affect asphalt quality.

This approach is not the present practice. Commonly the asphalt grade is set, along with specification prop-erties; for volatiles control, these latter are essentially limitations on the loss on heating and the reduction in penetration resulting. Yet variations in asphalt source or type and in normal refining methods may lead to considerable differences in these properties. Consequently, if the requirements are such as to suit the wide variety of asphalts which are offered commercially - or to suit the wide variety of asphalts which can be produced commercially by the best refining methods - the initial volatile content can be within allowed limits yet may vary considerably. This means that the consistency or penetration of the asphalt of any given grade after mixing may likewise vary. Obviously then this method of specifying the asphalt cannot result in the optimum initial binder properties unless the permissible tolerance in such properties is found to be considerable.

The solution to this difficulty offered by some engineers is to greatly limit the permissible volatiles, insuring the minimum reduction in penetration from volatile loss during mixing. Their argument is that any extra asphalt cost resulting is more than offset by the longer life of the pavement. This reasoning would be correct were there no other results from the requirement. Unfortunately there are, and they have serious implications.

The first is that the supply might be appreciably curtailed. Regardless of higher (perhaps even excessive, by present standards) prices, suppliers would hesitate to unbalance their current working up of their crude oil supplies as well as to risk the appreciable refinery investment involved, until the continued need for such processing and therefore the higher prices seemed indefinitely assured. Stringent specifications may

not greatly affect the total volume offered as long as only a few authorities demand them, but any general trend to extremely low-loss asphalts would probably cause trouble.

Of even greater importance is the probable effect of such requirements on the functional properties of the asphalt. Only certain constituents provide the strong film cohesion and adhesion needed for maximum bonding. These tend to be the harder, higher boiling fractions. Consequently the less active lighter fractions present with them must be of lower boiling point if the mixture (that is, the specified asphalt) is to be of the correct consistency. Permitting these lighter fractions to be too volatile defeats the purpose as they will show excessive loss in the mixing; but likewise unduly stringent volatility requirements are likely to lead to inferior binding properties in the asphalt. Unfortunately, methods are lacking today for directly measuring this bonding effectiveness, but some estimate of this quality from indirect indications and field observations is possible.

It is our present conviction that the benefits from such rigorous loss specifications would be far outweighed by inferior functional properties in the majority of asphalts supplied to meet them.

The above remarks may be summed up by the following statement: Excessive loss restrictions threaten to jeopardize both the asphalt supply and its quality, and certainly cannot be justified if any other approach (such as controlling the asphalt properties after mixing) can be developed.

We believe there is a practical approach to the problem as outlined. We will discuss this phase in our next issue.

Nevitt Further Discusses Spot Test and Comment by Oliensis

To the Editor:

We are greatly benefited by the comments of Mr. Oliensis on the spot test. There is nothing that crystallizes the picture like an active discussion of any controversial subject.

Strictly, there would seem to be no need to continue this discussion. Any specification requirement should be supported by amply documented evidence which clearly shows beyond reasonable doubt that it adds to the quality of the purchased article. We know of no such evidence in support of the spot test. In fact, we are not even aware of any theory claimed for the mechanism by which heterogeneous materials (truly so, or as defined by Mr. Oliensis) fail to function as well as a homogeneous product.

First, as to the matter of "heterogeneity." It should be noted that this property in the asphalt itself is not even tested by the Oliensis method; rather, it is the heterogeneity of the solution in some solvent which is

^a Mr. Oliensis in June ROADS & STREETS presented discussion of remarks on the Spot Test contained in Mr. Nevitt's "Views and Comments" page in April.

being noted. No observation under the microscope or otherwise, no tests that we are aware of, indicate that the asphalt films functioning in the pavement fail to be homogeneous.

This heterogeneity is a function of the solvent; furthermore, it is not a function of the strength of the solvent of the type used in the test (as Mr. Oliensis infers) but rather of the kind of solvent.

The liquid used in the specification test has less solvency for certain elements of the tars and pyrogenetic hydrocarbons as well as certain natural residues; but there are other solvents in which the converse is true. Presumably with these materials the negative Oliensis asphalts will show a spot, the positive asphalts will fail to do so. Then, depending on the solvent, an asphalt in one case may be homogeneous and in another case heterogeneous. These solvents are not used in construction, have no place in the practical picture that we can see. What makes a heterogeneous asphalt with one solvent but homogeneous with another one inferior? Why not the converse? Again we face the fact that there is no explanation why material, described as heterogenous because of its action with one particular solvent, should fail to have the functional qualities of another which shows no spot.

• As a matter of fact, we are treading on dangerous ground when we bring abstruse chemical terms into the structural picture. Heterogeneity has definite chemical significance but the products most used in commercial structures are definitely heterogeneous, far more so than any asphalts which show a spot by the Oliensis test. The river and glacial deposits widely used as aggregates are probably heterogeneous according to flotation tests with suitable chemicals, elutriation in liquids of the proper specific gravity, or other means of test. Yet they function satisfactorily in bases or pavements.

Most commercial forms of iron and practically all other structural materials are not chemically uniform but they do the job remarkably well. Again we come to the need of some clear explanation correlating the functioning of the material and its chemical characteristics. Not merely must an intelligible mechanism by which it fails to function be forthcoming, but practical evidence confirming this must be available; opinions are not enough.

There is a remarkably parallel situation in the petroleum industry. Some

three decades ago refiners widely advertised that they sold "straight run" gasoline - the "homogeneous" product separated from crude oil as distinct from the "heterogeneous" cracked gasoline just beginning to be used. And with some justice) they pointed to the occasional difficulties encountered with this latter material. But in a few vears the refiners learned how to control the gum that was an incidental by-product of uncontrolled cracking, and today's car will hardly run on the "homogeneous" gasoline, so that the oil companies are having to spend something like a billion dollars on equipment to reform it.

A similar trend is quite possible with asphalt for paving purposes. Perhaps in another decade we will be reforming it to get the superior adhesion and other properties associated with some positive spot asphalts, though in the course of doing so the volatiles incidental to the operation will be removed and the finished product refined for the need — but still highly "heterogeneous" by the spot test.

As regards the volatiles in cracked asphalts, we are confident Mr. Oliensis does not mean to imply that their presence is a forced result of heterogeneity as he defines it. He can readily satisfy himself on this point. He merely needs to carefully vacuum distill a cracked asphalt and replace the light oils removed by a cut of high flash gas oil. The resulting asphalt will show far less volatile content than most commercial asphalts, yet will still show a positive spot. Such materials have been, perhaps are being, commercially made and will be offered whenever the economic inducements are sufficient. Volatiles have been present in cracked asphalts simply because they are formed in the course of producing any asphalt (whether by nature underground or in the cracking operation) and need to be removed to give an asphalt which will not harden. Lacking specifications which force this, many cracked asphalts have been supplied with excessive volatiles and have failed for this reason regardless of their spot, just as would the negative materials if furnished in the same fashion.

It should be noted that we are not criticizing the spot test but merely its use in specifications. It is a simple form of the chromographic tests which offer so much promise in research on asphaltic materials. Modern design and operation of asphalt refining and processing equipment has progressed well beyond the point where the spot

test is ordinarily a sufficient indicator; but there are undoubtedly older installations with which it might be wisely used as an operating control.

There are many tests which in a limited field or with well known materials have utility for control purposes, but this is a quite a different use than in specifications applicable to a broad range of products.

• We are indebted to Mr. Oliensis for his development of the spot test. as it has led to much knowledge concerning asphalts. We need his imagination and ability to further explore the still almost virgin field of asphalt technology. Our objection is to the adoption of such tests into specifications without a proper background of knowledge, agreement, and demonstrated correlation with functional properties. We have too many specification requirements proposed which are based on plausible theory unsubstantiated by wide experience, or on a mumbo-jumbo of scientific nomenclature which has no meaning in the functioning of the product in use. The incorporation of such tests in specifications has wide economic repercussions. They tend to limit supplies and add to their costs. It is the job of the highway engineer to minimize such rather than to increase them.

The concluding comments of Mr. Oliensis clearly bring this out. The originator of the test, he states that he is just beginning to assemble practical evidence that in his opinion shows that homogeneity as he defines it is a functional asset. This may be true - we await the documentary facts - although it contradicts our own observations of many miles of pavements in a wide range of climates and countries. But if this evidence is just now being accumulated, what has the spot test been doing in our specifications all these years? What justification has there been for excluding asphalts which we have every reason to believe are superior, yet accepting asphalts which are highly homogeneous by the spot test procedure but definitely fail to function well according to direct observation in the field?

This is the point of our comments—that until some practical correlation has been established between the spot test and the functioning of asphalts in use it has no demonstrated relationship to the value of the material; therefore, from the specification standpoint is a bogus test, regardless of its merits as an observation tool in specialized utilizations.

H. G. Nevitt Kansas City, Missouri



Even on narrow roads, the Barber-Greene Windrow Loader is easy to maneuver . . . needs only an 8'6" turning radius. Here the 550 is working in Henry County, Ky.

County road official, Paul Stivers, says:

"Our Barber-Greene has cut costs on all our windrow loading jobs"

Picking up windrowed material has long been one of the most costly material handling operations. The Barber-Greene Model 550 brings a new low-cost answer to this problem. Mr. Stiver reports, "Our Barber-Greene handles an average windrow 3 feet wide and 20 inches high . . . fills a standard 2-ton truck in less than 90 seconds.

"Our 550 is easy to handle in tight quarters and has the productive capacity to keep all our trucks busy all the time. We readily recommend it to others doing similar work."

These are a few reasons why the Barber-Greene Windrow Loader is building a fine reputation in a hurry. This loader was designed for the average size job. Where larger, more expensive loaders require special fleets of trucks, this compact loader has a realistic capacity that keeps ahead of trucks normally available, and cuts the high cost of windrow loading.

High travel speed, exceptional maneuverability and simple operation provide a loading efficiency unobtainable in the past. Yet the cost of the Barber-Greene Windrow Loader is about ½ the cost of similar machines.



Here's the low-cost answer to normally truck-bottlenecked operations. New claw feeder principle permits loading at 4 cu. yd. per min. Easily converts to a leafloader or to handle snow at 7 cu. yd. per min.

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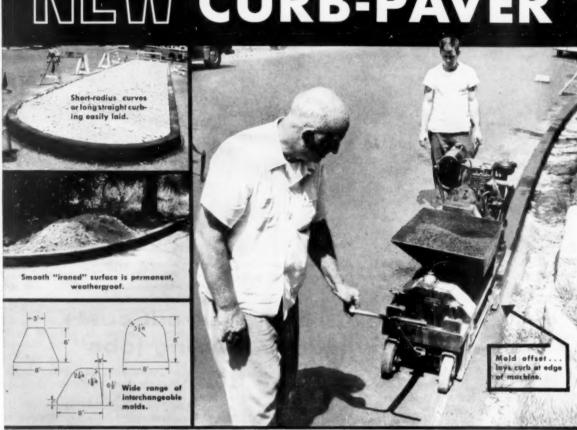
Write for literature on the windrow loader that's right for your jobs.



CONVEYORS...LOADERS...DITCHERS...ASPHALT PAVING EQUIPMENT ... for more details circle 185, page 16

ROADS AND STREETS, July, 1956

CURB-PAVER



Now you can lay beautiful weatherproof bituminous curbs at speeds of four to six ft per minute without curbing forms! The new self-propelled Etnyre Heavy-Duty Automatic Curb-Paver lays, compacts, and finishes straight or curved bituminous curbs in one fast, easy trip. Compaction is over 90 per cent, equal to that of a 12- to 15-ton roll!

The exclusive Etnyre heat-jacketed curbing mold utilizes engine exhaust gases to blast-clean and preheat paving-surface ahead of machine, eliminating tack coat in many cases.

Mold's inner surface "irons" every foot of curb, producing exceptionally smooth, weatherproof finish. Exclusive offset

of the mold allows you to lay curb along the very edge of the pavement or within one inch of any obstacle.

Machine weighs 750 lb, requires no rails, is easily maneuverable. The two men who operate it require no special training. Designed for fast, easy loading, cannot be overloaded. Compaction screw and screw sleeve constructed of the ultimate in abrasive-resistant steel.

If you lay curbs for streets, roads, traffic islands, or parking areas, don't delay in learning the full details of how the Etnyre Automatic Curb-Paver saves money, time, and trouble! Phone your nearby Etnyre dealer, or write E. D. Etnyre & Co., Oregon, Illinois, U.S.A.

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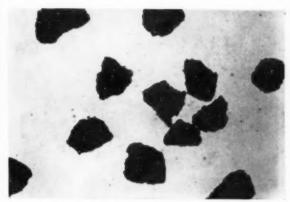
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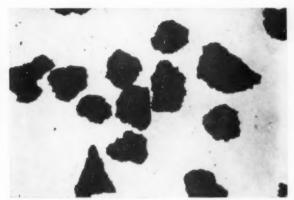


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ROADS AND STREETS, July, 1956



• Fig. 1 - Lightweight filler particles.



• Fig. 2 - Limestone filler particles.

Use of Lightweight Mineral Filler In Louisiana

Gradation and particle shape for the minus 200 fraction of aggregate are found to have a bearing on mix quality. Louisiana specifications now designate gradation limits for fractions down to .001 minimum.

By H. L. Lehmann

Testing & Research Engineer, Louisiana Department of Highways.

and Verdi Adam

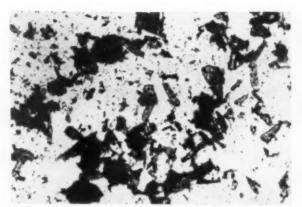
Senior Assistant Research Engineer, Louisiana Department of Highways, Baton Rouge.

NCREASED highway construction in Louisiana and the demand for materials required an investigation for the purpose of exploring new sources that were economically feasible and qualitatively suitable for use. The shortage of mineral filler, for use in hot-mix, hot-laid, asphaltic concrete mixtures, was one of the major problems, and required immediate consideration. Therefore, for the purpose of finding a solution to this shortage, numerous fine materials were tested among which were fine silts, fine sands, by-products, waste products, as well as materials that would be produced in case they were acceptable. During this investigation a filler prepared by pulverizing lightweight aggregate was found suitable.

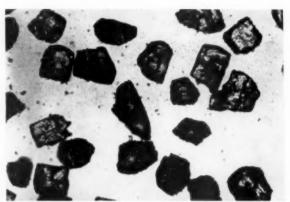
Perhaps, it would be of interest to review briefly some of the indications of the previous studies made by Louisiana Department of Highways as well as other agencies. The observations lead to the conclusion that the performance of fillers is mainly affected by their particle shape and gradation.

The particle shape plays an important role in the effectiveness of mineral fillers. Angular shapes are more desirable than thin, flat and elongated particles. As the percentage of these undesirable shapes increase, the quality of the filler is affected. In Figures 1-4, microscopic pictures of lightweight filler, limestone filler, oyster shell dust and another finely ground material are given, respectively. All four of these materials have approximately the same gradation. However, a laboratory study showed that the mixtures produced by use of these four materials were in the following order, ranging from the best to the worst, considering the laboratory re1) Lightweight filler, 2) limestone filler, 3) oyster shell dust, and 4) the unidentified material. Analyzing the pictures, we note that the lightweight filler (Figure 1) has sharp and angular particles. The limestone filler (Figure 2) has approximately the same particle shape; however, a very small portion of the particles are thin and flat. Again, the shell dust (Figure 3) has a higher percentage of thin particles than limestone dust. Furthermore, some of the particles are elongated. The unidentified material (Figure 4) has a very high percentage of the particles which are thin and flat.

The gradation is another property, and possibly the most important of mineral fillers. During the preliminary work, it was observed that the current AASHO gradation requirements do not specify any values for the fine sizes. Although limits are set forth to cover Numbers 30, 80 and 200, no reference is made to the gradation of the fraction passing a No. 200 mesh sieve. Referring to Figure 5, we note typical gradations of limestone dust, ovster shell dust, lightweight filler and a fine sand. All of these materials meet the AASHO specifications. Nevertheless, the fraction of the fine sand passing a No. 200 mesh sieve is not well graded and does not contain any material that is finer than 0.001 mm. in grain size. Making incremental increases in the quantity of fine sand, in an asphaltic concrete mixture, rather than improving the test properties, serves to increase the percentage of







• Fig. 4 - The particles of a filler of inferior quality.

voids, decrease the unit weight and have no appreciable effect on the Marshall Stability. Consequently, mixes made using this material result in an inferior quality as compared to those prepared by use of materials that are well graded down to 0.001 mm. In order to eliminate undesirable, uniformly graded fillers, additional fine size requirements were included in Louisiana Specifications. These limits, adopted to supplement the AASHO requirements, which have been in use since Aug., 1954, are given in Table I.

The particle size distribution of the fraction finer than a No. 200 mesh

sieve is being determined by use of "Standard Methods of Mechanical Analysis of Soils," (The Hydrometer Test), AASHO Designation T 88. The test is being run in the soils laboratory using Sodium Silicate as a defloculating agent and in the same manner as the soils samples. For the seive analysis of the fraction coarser than a No. 200 mesh sieve, "Standard Method of Test for the Sieve Analysis of Mineral Filler," AASHO Designation T 37, is being used.

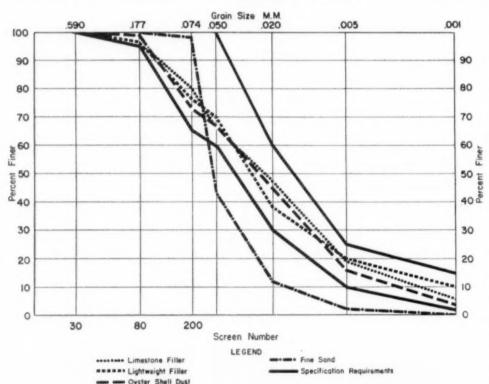
Referring back to Figure 5, we can compare the gradations of limestone dust, lightweight filler and the fine

sand with Louisiana fine size requirements. It will be noted that the fine sand is not within the specified limits. Therefore, we can conclude that a mineral filler, in order to perform its job properly, should have angular particles which are not flat and again should be well graded from coarse to fine. The gradation requirements mentioned in the preceding paragraphs and a microscopic study of the particle shape has been found to be an accurate and a simple method of eliminating the use of undesirable fillers such as silt with flat particles and fine sand with a uniform gradation.

Let us now analyze the effects of the limestone filler, lightweight filler and the fine sand, on the test properties of a typical wearing course mixture (Figures 6-9).

Owing to its high affinity for bitumen, the lightweight filler requires more asphalt. The optimum asphalt content of this mix is 5.8%, whereas the optimum for the limestone mix is 5.5%. This would possibly complement the durability of the pavement.

The highest stability values were obtained with the lightweight filler. Limestone is in the middle and the values obtained with sand are appreciably lower.



• Fig. 5 - Gradations of different types of fillers

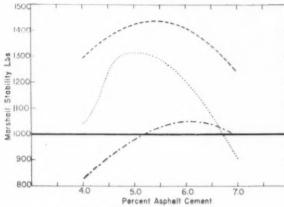


Fig. 6 — Relation of asphalt content to Marshall Stability for various fillers.

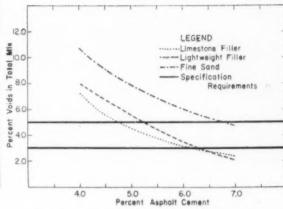


 Fig. 7 — Relation of asphalt content to percent voids in total mix for fillers tested.

The Marshall Stability curve for limestone has a much steeper slope than the one for lightweight filler. This can be considered as a favorable aspect of the lightweight filler. In this case, an error made in weighing the asphalt, at the mixing plant, would not affect the stability values of the resulting mixture as much as it would in case of limestone dust.

Curves representing the percentage of voids in total mixture and the percentage of voids filled with asphalt show that these values are approximately the same for both limestone and lightweight fillers, at their respective optimum asphalt contents. The results obtained by the fine sand are not anywhere near the allowable limits.

Flow curves indicate that incremental increases in the asphalt content have a much higher effect on the plasticity of the mixtures prepared with limestone filler than those made by use of the lightweight filler.

The second stage of this study consisted of two test section that were

Table I

Louisiana Gradation Requirements for Mineral Fillers

U.	5. S	ieve																				G	ra	in	Size	mm	F	Percent Finer
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1	lo.	200							e x					 		* 1				 	 			(0.07	1		65-100
	-	-					 *							 					 × 1		 			(0.05)		60-100
	-	-	. *						K 8					 	 		s s					 8		(0.02)		3060
	-	-																							0.00			10-25
	-	-											k i	 	 * *			*	 к.			 ×	* *	(00.0	1		2-15

built using the lightweight filler, along with a control section with limestone dust. These were placed during the resurfacing operations of Choctaw Drive in Baton Rouge, a street located in the midst of the industrial section of the city. It has a traffic volume of 10,800 vehicles per 24 hours. There is a railroad crossing the test strips causing the traffic to decelerate on the experimental section (Figure 11).

The test strips were placed using a wearing course mixture, 2 in. thick, on a 3-in. binder course mix. Asphalt cement, 60-70 penetration, was used throughout this project.

Based on the preliminary laboratory studies, the plant was set up for 5.8% asphalt cement for the first strip, with the lightweight filler; and, in order to secure additional information regarding the behavior of this material in presence of excess asphalt, 6.3% was used in the second strip. The asphalt content of the third strip, which was the control section, was set at 5.5%.

The lightweight filler used in this experimental project is produced by burning clay, with a very high silica content, in rotating kilns at 1900 deg, F. The material when discharged is red hot and in the form of coarse ag-

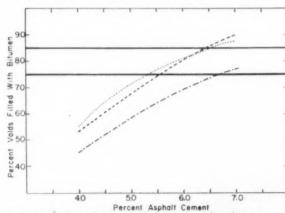


 Fig. 8 — Relation between asphalt content and voids filled with bitumen for mixes using various fillers.

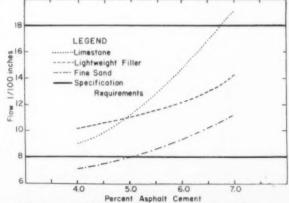


 Fig. 9 — Relation between asphalt content and blow for various fillers.



 Fig. 10 — Surface texture of the pavement on the test section with lightweight aggregate.

gregate, resembling slag in structure. The filler is produced by crushing this material to the required fineness. It is non-plastic and has the following predominant chemical composition:

Loss on Ignition, %	0.50
Silicon Dioxide, %	-
Insoluble Silicates and	
Silicon Dioxide, %	
Ferric Oxide and etc., %	7.00
Calcium Oxide, %	1.00
Undetermined, %	0.90
	100.000

This lightweight aggregate is highly absorptive, contains higher percentages of hygroscopic moisture, yet has no tendency to flocculate. Since, very humid conditions are encountered in Louisiana, resistance to flocculation is very desirable in this case.

The proportions of different fractions of the aggregate used in all three sections are given in Table II. The average results of tests that were conducted during this experiment on samples obtained from the plant are noted in Table III.

Table II Aggregate Proportions

																												16.0%
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Sand		÷		ж							×					*	8-											60.0%
Filler		9.			×		*		*	×	×	,		*	,			ĸ	*	6	*	8	ĸ		*	×		4.0%

The observations made during this project and the results of tests of the finished mixture indicate that:

 Reasonable variations in the bitumen content do not considerably effect the stability values.

2. Having a high affinity for bitumen, the lightweight filler permits the use of more asphalt in the mixture, of the roller as is obtained in compacting a mixture made with limestone filler.

A condition survey made after eight months of heavy service showed that the test sections were all in excellent condition. Consequently, the lightweight filler was accepted for use in asphaltic concrete construction as an afternate for commercial mineral filler.

New Jersey Turnpike patronage continues up

First-quarter figures for operations on the New Jersey Turnpike are reported as follows:

- A 5.9 per cent increase in number of revenue vehicles despite heavy snowstorms and generally bad weather.
- Tolls of \$4,392,000 representing a 3.2 increase over the first-quarter of 1955.
- A traffic fatality rate of 3.6 per 100,000,000 vehicle-miles compared with 2.76 for all of 1955.

Table III Summary of Average Test Properties

		Section	Lightweight Section I	Lightweight Section II
Aggregate, %			94.3	93.7
Asphalt, (60-70 Pen.), %			5.7	6.3
Specific Gravity		2.305	2.304	2.307
Percent Theoretical Gravity		94.2	95.4	96.4
Density — Lbs./Cu. Ft		143.8	143.8	144.0
Percent Voids — Total Mix	****	5.8	4.6	3.6
Percent Voids Filled		68.2	73.7	79.8
Marshall Stability at 140° F	1	035	1315	1040
Flow 1/100 inch		9	11	15

hence possibly complementing the durability of the pavement.

This material does not cause any difficulties at the plant that can be attributed to its use.

4. The placement and compaction of the mixture are satisfactory. The increased stability values, due to the use of lightweight filler, do not decrease the workability of the mixture. The required roadway densities can be obtained with the same number of passes

The spectacular storms in mid-March were so severe according to this report that from March 16 to 20 inclusive, traffic was cut to 36 per cent of normal. Despite this, an average of 61,500 vehicles per day entered the turnstiles during the quarter. Traffic volumes are expected to rise sharply this summer, when the Newark Bay extension connecting with the Holland Tunnel into New York is opened.

Truck patronage continued to rise, being 8.2 per cent over the 1955 firstquarter in truck numbers and 6.2 per cent up in toll revenue.

The road's accident rate of 117.9 per 100,000,000 miles of vehicle travel is about one-quarter of the rate of the New Jersey Public Highway system. The fatality rate as noted above was increased slightly by the experiencing of seven fatalities. Three were due to single-car accidents, ascribed to fatigue or driver failure.

• Fig. 11 —Over-all picture of the test section.



Plan To Be At The ARBA Road Show

New York State Engineers build road in spite of slashed budget. Bitumuls with local aggregate is selected.

When a drastic cut in appropriations forced the New York State Department of Public Works to reduce a project to a minimum expenditure, they turned to the proved method of Bitumuls-Native Aggregate construction. Based on the experience of several of the counties in the region, they knew this to be a sound method of stretching road-building dollars.



Rotary mixer and Bitumuls tank truck work in tandem to stabilize 4" lift of base aggregate.

The original plan

Airport construction at Riverhead, Long Island forced the relocation of the Wading River-Manor Road. As engineered by the State Department of Public Works, plans for this road originally called for two 24 ft. lanes for a length of approximately 6 miles. Financing, through the U.S. Bureau of Public Roads, struck a snag; and drastic economies were required to keep the job alive. In adjusting to the lower appropriation, it was decided to reduce the project to one 24 ft. lane, of a length allowable under the available monies.

New estimates indicated this would amount to approximately 3.16 miles, and invitations based on this distance were put out for bids. These specifications called for an 8 inch stabilized base, with 1" Asphaltic Concrete surfacing.

Job data

Local selected soil, sand, and gravel blended to meet the following dry sieve specifications were used for ... for more details circle 180, page 16 the stabilized base work on this job.

Sieve	Specification	Aggregate Used
1 1/2 " Sieve	100	100
1" Sieve	90-100	84.5
3/4." Sieve	60-80	78.3
1/4" Sieve	30-50	64.2
#10 Mesh	20-40	50.5
#40 Mesh	10-30	10.9
#80 Mesh	7-8	5.6
# 200 Mesh	5-15	3.8
Emulsified Asphalt	5-7%	5.75%

The amount passing the 200 mesh was specified to be not more than one-half the amount passing the 40 mesh sieve.

Aggregate was blended at the pit, approximately five miles from the job site, tested, then trucked to, and spread on, the sub-base. Enough such material for the bottom four inches of the base course was brought in and spread. Bitumuls Emulsified Asphalt, mixing grade, was pumped directly from the transport truck into a Rotary type mixer. This first 4" base course was mixed, rolled, and cured. Aggregate was then brought in for the second 4" course and the process repeated.

Heavy rains encountered

During the construction of the base course, two separate hurricanes interrupted job-progress. Delay was held to a minimum because Bitumuls readily coats damp aggregate, and damage caused by the storm was restricted to exposed areas of the sub-base plus those areas of the stabilized base that were not cured.

Surface course construction

The 8" Bitumuls Stabilized Base was topped with 1" fine aggregate Asphaltic Concrete surface course. Spreading and compaction of this material was accomplished by conventional methods. The surface course was extended 1 ft. on either side of the 24 ft. pavement to provide a degree of shoulder stability. Upon final acceptance, the road was turned over to the town of Riverhead, New York, by the contractor.



Sound paving, with economy... Bitumuls Emulsified Asphalt used with local aggregate

ROAD-BUILDERS throughout the nation have come to recognize the value of Bitumuls[®] Emulsified Asphalt in holding the cost of road construction to the lowest possible level.

A major factor in this economy: Bitumuls' compatibility with local or in-place aggregates, even though they be hydrophilic. This eliminates costly transportation of imported materials.

Our Engineers, operating out of our nationwide network of offices, will gladly provide complete information on specific grades of Bitumuls for various types of pavement construction.

Bitumuls is used extensively for maintenance work, too. Call our nearest office for complete details.



American Bitumuls & Asphalt Company

200 Bush Street, San Francisco 20, Calif.

St. Louis 17, Mo. Tucson, Ariz. Perth Amboy, N. J. Mobile, Ala. Oakland 1, Calif.

Cincinnati 38, Ohio Inglewood, Calif. Baltimore 3, Md. San Juan 23, P. R. Portland 7, Ore.

LEADING MARKETERS OF ASPHALTS, CUTBACKS AND BITUMULS—NATIONWIDE

ARBA's Roadside Committee Meets in Washington



 Roadside engineers consider committee action to keep up with the expanding highway program.

Thirty-five engineers, officials and industry representatives who are members of ARBA's Technical Committee on Roadside Construction and Maintenance, met in Washington, D. C., May 15-16. The meeting was conducted by Committee Chairman Harold J. Neale, landscape engineer, Virginia Department of Highways. The Committee, one of ARBA's most active study groups, is engaged in examining all facets of new develop-

ment concerned with roadside improvement.

In the photo (standing): Dale T. Friday, agronomist, Allied Chemical & Dye Corp., Indianapolis, Ind.; W. B. Ennis, Jr., Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Md.; D. L. Miller, National Agricultural Chemicals Association, Washington, D.C.; L. C. Gibbs, Federal Extension Service, U. S. Department of Agriculture, Wash-

ington, D.C.; A. M. Vance, Entomology Research Branch, U. S. Department of Agriculture, Beltsville, Md.; R. C. Brown, U. S. Forest Service, Upper Darby, Pa.; S. F. Potts, U. S. Forest Service, New Haven, Conn.; W. H. Simonson, chief, Roadside Section, U. S. Bureau of Public Roads Washington, D.C.; and William C. Greene, Connecticut State Highway Department, Hartford, Conn.

(Seated): Delos L. James, American Seed Trade Association, Chicago, Ill.; George H. Stram, Oliver Corp., York, Pa.; Maj. Gen. Louis W. Prentiss (ret.), executive vice president, American Road Builders' Association, Washington, D.C.; Mr. Neale; C. O. Eddy, Niagara Division of Food Machinery and Chemical Corp., Middleport, N.Y.; and Harold F. Clemmer (ARBA coordinator of technical activities), engineer of materials and standards, District of Columbia, Washington, D.C.

Turnpike connector planned into Kansas City area

A connecting spur 4.2 miles in length to be known as the 18th Street project is planned in Kansas City, Kansas. It will connect the Kansas Turnpike with the Greater Kansas City central area, extending as far as the state line with Missouri. Estimated to cost \$16,700,000, the project is to be financed by revenue bonds according to an announcement by Gale Moss, general manager of the Kansas Turnpike Authority.

A viaduct 2.590 ft. long would span the bottoms along the Kansas River and the extensive railroad trackage would require another bridge 2.228 ft. long.

Final feasibility reports indicate that the project will support a \$12,000,000 revenue bond issue. A contingent subsidy financing of \$4,700,000 would be required until the traffic and revenue increased to the point of carrying the entire financial load. Two non-toll segments in the road would cost \$3,550,000 and \$975,000 respectively for construction. The entire project would be a four-lane divided facility with fer ced right-of-way and all street and railroad crossings separated.

• A one-week Pilot Conference on Highway Management will be held on the campus of Cornell University at Ithaca, N.Y., beginning July 15. The conference will be jointly sponsored by the American Association of State Highway Officials and the National Highway Users Conference. Cornell is cooperating by furnishing space and staff assistance.





GET MORE
COMPACTION
WITH LESS
DOWN TIME
WITH GRACE
PNEUMATIC
ROLLERS —
7 TO 60 TONS.

GRACE SWEEPERS AND COMPACTORS

Axle-driven, engine-driven or tractor-mounted sweepers extra large brush for long wear.



W. E. GRACE MFG. CO.

6007 S. Lamar

Dallas 15, Texas

. . . for more details circle 215, page 16

What's New in Equipment and Materials

Reader Service Coupon on Page 16

Brush Cutter

A new bush cutter, announced by Mc-Culloch Motor Corporation, 6101 West Century Blvd., Los Angeles 45, Calif., has a 6 ft. reach, and a 10-in. circular



McCulloch Brush Cutter

saw blade. The complete unit, including engine, weighs only 28 lb., and can be operated easily by one man. With accessories, it can be converted into a chain saw or all-purpose drill.

> For more information circle 106 on Service Coupon Page 16 and mail now

Three Angling Blade Bulldozers

Three new angling blade bulldozers, designed for use with Caterpillar No. 977, No. 955 and No. 933 Traxeavators,



No. 955 Traxcavator Equipped with New No. 955A Angling Bulldozer Blade.

have been announced by Caterpillar Tractor Co., Peoria, Ill.

The new bulldozers have been designated the No. 977A, No. 955A and No. 933A respectively. They have been developed as a part of Caterpillar's continuing program to provide a complete line of attachments for Traxcavators.

With the exception of the No. 933A C-frame group, these bulldozers consist of the same blade and C-frame groups as the No. 6A, No. 4A and No. 2A bull-dozers. Strong links are used to connect the bulldozer C-frame to the Traxcavator lift arms.

For more information circle 107 on Service Coupon Page 16 and mail now.

New Clamshells Added to Erie Line

Two new groups have been added to the Erie line of clamshell buckets of Erie Strayer Co., 2836 Geist Road, Erie, Pa. These are % to 4-yd. light rehandlers and % to 2-yd. extra heavy-duty hard diggers. Through the use of equalizer bar arrangement the complete line can be adapted to 3- or 4-line application.

This brings to six the number of 2line models offered by Erie Strayer; the other four being standard rehandler, barge type wide rehandler, general purpose and heavy duty. In addition, there is the industrial group of 1- and 2-line mechanical hook-ons and the Strayer electric.



New Erie Heavy Duty Bucket

For more information circle 108 on Service Coupon Page 16 and mail now.

Back Rippers

New, oversize back-rippers for Caterpillar D9 tractors have been introduced by Preco Incorporated, 6300 E. Slauson Ave., Los Angeles 22, Calif. The rippers are available for Caterpillar No. 9S straight blade bulldozers.



New Preco Back Ripper

These rippers are comprised of four housings with pivoted shanks capped with lock-on teeth. The housings are welded to the reverse side of the straight blade moldboard.

The outer back-rippers dig into the ground approximately 18 in. as the tractor backs up. The inner shanks rip to a 12 in. depth. On the forward trip the rippers skid on top of the ground. Where desired, one or more of the shanks can be pinned up out of the way. The outer shanks can be raised to a 12-in. ripping depth, also.

Both the shanks and removable teeth on the new Rippers are made of heat treated chrome molybdenum steel. The teeth have a width of 5¼ in. and when ripping to full depth will break out material to entire width of the bulldozer blade.

For more information circle 109 on Service Coupon Page 16 and mail now.

Tractor Shovel Has New Features

A larger model "HO" "Payloader" tractor-shovel with numerous new features, announced by the Frank G. Hough Co., Libertyville, Ill., has a heaped capacity of 2¼ cu. yd. and a struck capacity of 1¾ cu. yd.

In addition to a complete "no-stop" power-shift transmission and torque converter, these new units are equipped with planetary axles and torque-proportioning differentials.

The primary reduction in the heavyduty planetary final drive is accomplished by hypoid pinion and ring gear in the differential. The secondary reduction oc-



Model "HO" "Payloader"

curs in the wheel hubs at the point of

final power application.

Being introduced to the tractor-shovel field for the first time, the "torque-proportioning differential" combats wheel slipping. This feature adds greatly to the overall effectiveness of four-wheel-drive. When the wheels on one side encounters poor tractive conditions and tends to slip, the torque-proportioning differential automatically delivers more power to the opposite wheel. Up to 24 per cent more torque is stated to be provided to the wheel with the better traction.

The major features of "pry-out" bucket action and 40 degrees break-out at ground level which permits getting and keeping bigger loads, have been retained.

A hydraulic load shock-absorber is standard on the new model. This device cushions the load during travel cycles reducing spillage and enabling the operator to deliver more material.

> For more information circle 110 on Service Coupon Page 16 and mail now.

Truck Crane

A truck crane version of the recently improved Model 305 excavator has been announced by the Koehring Co., Milwaukee 16, Wis. As a crane, it will lift loads up to 25 tons and its road travel speed is listed at 30.2 mph.



Model 305 Truck Crane

According to officials of the Koehring Co., all the improved operating and maintenance features introduced earlier this year in the 305 crawler excavator have been retained in this truck mounted model. The upper machinery arrangement has been simplified to contain only two major horizontal shafts and the all-welded turn-table is equipped with integral sidestands on which the main cross shafts revolve in antifriction bearings. The truck crane turntable swings on six adjustable hook rollers that resist tipping in any direction.

For special high lift crane service, the standard 30 ft. main boom can be extended to a maximum allowable 100 ft. length. In addition, a jib boom up to 30

ft. length can be added.

The 305 truck chassis is provided with 5 main and 2 auxiliary forward speeds. Quick, safe stops are assured by air brakes built into each of the 4 double tired rear drive wheels. Standard wheel-

base has been increased to 205 in, with 9 ft, axles to provide greater lift capacity over the side and rear. Front and rear outriggers provide extra support during stationary lifting operations.

For more information circle III on Service Caupon Page 16 and mail now.

New ¾ yd. Bucket for Hydrocrane

A new %-yd. clamshell-type material handling bucket, for use with the truck-mounted, all-hydraulic H-5 Hydrocrane, developed by Bucyrus-Erie Co., South Milwaukee, Wis., is claimed to be faster operating (both closing and opening) than conventional cable-operated buckets because foot-controlled selector valves enable operator to channel all of the machine's available horsepower into the digging action.

With two double acting hydraulic rams forcing the bucket bowls closed,



New 3/4 yd. Bucket

the manufacturer claims penetration is better and payloads are bigger because the bucket digs in with its full weight. Lower ends of the rams are attached directly to the upper edge of the bowl sections. Since the dual rams — one for each bowl — never extend into the bucket, there is no load interference. Use of twin rams, coupled with improved leverage, is stated to provide added force to the lips at the point of closing.

Bowls of this bucket are interchangeable with those of the ½-yd digging bucket, providing two different units for little more than the cost of one. To assist in picking up loose material and for light digging service, a set of five high carbon forged teeth can be furnished as extra equipment.

To speed bucket changes, the tagline hose connection is equipped with a quick-disconnect coupling. The bucket can be attached or detached in a few seconds without the use of tools and without oil spillage.

For more information circle 112 on Service Coupon Page 16 and mail now.

Fork Lift

The new Ottawa Tracto-Lift, introduced by Ottawa Steel Division, L. A. Young, Spring & Wire Corp., P.O. Box 39, Ottawa, Kan., is especially designed for outdoor materials handling.

Large pneumatic tires on the front drive axle provide extra traction and excellent flotation. Extra ground clearance and shortened wheel base also contribute to the efficiency and maneuverability of the Ottawa Tracto-Lift, which is available in three basic models: TL-50 (5000



New Ottawa Tracto-Lift

lb. capacity), TL-60 (6000 lb. capacity), and TL-70 (7000 lb. capacity).

The Ottawa outdoor fork lift has many important features included as standard equipment, such as shuttle gear transmission with control lever on steering column, providing 6 speeds forward and 6 speeds reverse; power steering: hour meter; lights; ignition key starting; and horn.

This unit is available with pallet forks of various lengths, as well as concrete block tine forks. A side shifter load carriage for use with either pallet or tine forks is optional equipment. The standard load carriage is 48 in. wide, but a 64 in. carriage is also available.

For more information circle 113 on Service Coupon Page 16 and mail now.

Rotary Mower Cuts Tall Weeds

A new heavy-duty, self-propelled rotary mower, the Series "F," announced by Kut-Kwick Corporation, Department R-41, Brinswick, Ga., is designed especially for large-area, heavy weed and grass cutting. There is a choice of three air-cooled engines — ranging from 3.6 to 5.6 hp — and cutting blades of 26 or 28 in. The transmission is fully enclosed with no chains or sprockets, and power drives both rear wheels. These wheels are 4 by 16 in., with pneumatic tires to allow the machine to navigate over extremely rough terrain. The large wheels also give the operator "fingertip" balance, with the weight of the machine well distributed over wheels so machine can be tilted up to clear obstructions.



"Series F" Rotary Mower

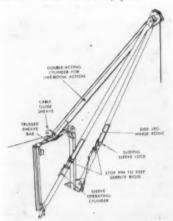
For more information circle 114 on Service Coupon Page 16 and mail now.

Kit Converts Derrick to Live-Boom Unit

A new field kit that makes it possible to quickly convert a rigid tripod derrick into a hydraulically-operated, live-boom unit, has been developed by J. H. Holan Corporation, 4100 West 150th St., Cleveland 11. Ohio.

An outstanding feature of the kit is that it makes live-boom action possible even though the existing derrick has a single drum winch.

A derrick can be easily converted in the field by a mechanic. Side legs are cut and hinged, and the center leg is cut for installation of the Holan double-acting cylinder which provides live-boom action. The kit includes all hydraulie components and piping. The hydraulic control valve is conveniently located on the rear of the truck body panel.



Typical Tripod-Type Derrick after being Converted to Hydraulic Operation by Holan Series 5900-C Conversion Kit

For more information circle 115 on Service Coupon Page 16 and mail now.

Light Control Needs No Orientation

Although interchangeable with Lumatrol Model "A" and incorporating the same convenient plug-in-out design adaptable to any make luminaire, the new Model "S," announced by Micro Balancing, Inc., Garden City Park, N.Y, is stated to offer several advances in light control for street and highway installations



Model "S" Lumatrol

Everything FOR MORE PROFITABLE PAVING JACKSON PAVING TUBE (INTERNAL TYPE) MACADAM BASE COURSES, SUB-BASES, SOIL-CEMENT PAVING, FILLS The JACKSON MULTIPLE COMPACTOR has now thoroughly demonstrated that it is by far the most advantageous equipment for achieving or exceeding specified densities in rock, slag, sand, gravel...all granular soils used in waterbound and penetration macadam construction, and in filling the voids in rock and slag courses with fines. The Jackson does it in about half the time required with other types of equipment. It is equally efficient for consolidating large granular soil fills such as bridge approaches and kindred projects.

JACKSON INTERNAL TYPE PAVING TUBE

Supplied with extraordinarily powerful motors, no concrete highway or airport paving job is too tough for this improved machine. Tubes vibrate deep in concrete, quickly plasticizing harsh dry mixes in slabs to 24" thick and as wide as 25'. It saves time, saves cement; provides greater density and compressive strength. Cuts spreading costs where no spreader is used. The tube is made up of one unit as shown for each 5'-0" (maximum) of slab width. Usually attached to front of finisher and controlled by finisher operator. Power is supplied by a Jackson Power Plant mounted on the parent equipment. Use of a JACKSON Side Form Vibrator on

standard finisher assures thorough consolidation and plasticity of concrete at side and center forms — with no "missed" spots. Labor savings effected quickly repay cost of equipment.

MUNICIPAL PAVING — BRIDGE DECKS, ETC.

For jobs of this type a JACKSON Vibratory Screed and Portable Power Plant is the most con-venient, productive and inexpensive outfit you'll find anywhere. Strikes off to any crown, under-cuts at curb and sideform, works right up to and around all obstructions. Two men easily handle it on all slabs up to 30 feet wide, and it may be rolled back for second passes on 4 rollers.

PORTABLE POWER: Thoroughly reliable, timeproved plants in capacities of 1.5 to 7.5 KVA . . equipped with permanent magnet generators requiring no maintenance or adjustment. They provide both single and 3-phase 120V., 60 Cy., AC and may be used for lights as well as operating all JACKSON equipment.

JACKSON VIBRATORS, INC. LUDINGTON MICHIGAN

JACKSON VIBRATORY SCREED

JACKSON SIDE FORM

VIBRATOR



JACKSON POWER PLANT

FOR SALE OR RENT AT YOUR JACKSON DISTRIBUTOR

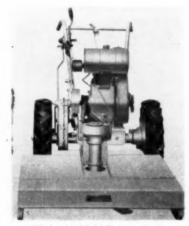
A departure from conventional circuitry for this type device is the elimination of the photo-tube. Instead the unit utilizes a light sensitive cadmium sulfide cell, said to have infinite life and minimum sensitivity to atmospheric changes. The C/S cell is claimed to provide the means which results in an exceptionally stable, low impedance circuit. Of special interest to those concerned with full automatic street lighting control is the completely omni-directional light sensing characteristic of the Model "S." Accurately sensing the mean light level, regardless of obstructions, shadows or compass direction, the unit needs absolutely no orientation.

For more information circle 116 on Service Coupon Page 16 and mail now.

Mower Does Many Clearing Jobs

The new "Series E" multi-purpose heavy duty power unit, announced by Kut-Kwick Corporation. Department R-41, Brunswick, Ga., is stated to be more than a grass or brush cutter. It features a complete series of heavy-duty attachments that enables it to mow grass, cut tall weeds and dense underbrush, fell trees, remove stumps, power a snow-dozer blade, plow, disc, cultivate land, and a number of other jobs.

It is designed for use in clearing firelanes in dense undergrowth, mowing highway or railroad rights-of-way, clear ing land, and other engineering jobs that require a hard-working, economical machine,



"Series E" Multi-Purpose Unit

Two engine choices are available—either the 6.8 or the 8.25 hp Wisconsin. The unit is self-propelled, and has a reverse drive. It has a fully-enclosed, geared transmission which operates entirely independently of the cutter unit. The machine has free wheeling in neutral, and a differential action axle driving both rear wheels.

For more information circle 117 on Service Coupon Page 16 and mail now.

Rotary Scraper

An all new Rotohaul scraper, announced by Be-Ge Manufacturing Co., Gilroy, Calif., is designed for use with 40-60 hp wheel tractors. The Rotohaul, with 6½ cu. yd. struck capacity, is a new design rotary scraper, engineered to move earth with less horsepower.

The double cutting action of loading vanes and cutting blade is stated to eliminate piling earth ahead of scraper blade. This permits high speed loading in third or fourth gear — in loose and sandy material as well as hard ground. The Rotohaul loads from the rear, with no spillage at the sides. Dumping is from the front, in plain view, and depth of spread is uniform from 1 to 16 in.

Be-Ge's full hydraulic control allows the tractor operator to regulate cutting blade, elevation and dumping.



New Be-Ge Rotohaul Scraper

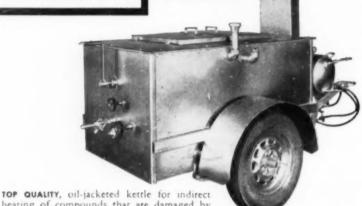
For more information circle 118 on Service Coupon Page 16 and mail now.

Power Pump Increases Speed of Hydraulic Jacks

A substantial increase in the operating speed of hydraulic jacks and pullers is stated to be achieved with the use of a new electric hydraulic power pump announced by Templeton, Kenly & Co.,

White

F-10 COMPOUND KETTLE



. . . FOR LOWER COST

MELTING OF JOINT

COMPOUNDS

heating of compounds that are damaged by high temperatures.

FOOLPROOF manual burner adjustment.

LOW COST of \$998 f.o.b. factory, complete with two thermometers (one for heating-jacket oil, one for compound), manual agitator, oil burner, steady rest, towing eye, tires. Engine agitator or propane heating available

CAPACITY: 120 gallons of compound

FOR LITERATURE, WRITE

WHITE MANUFACTURING COMPANY, ELKHART 20, INDIANA

for more details circle 261, page 16

OTHER PRODUCTS

Asphalt Plants

Surface Heaters,

Torches and Burners

Tool Heaters.



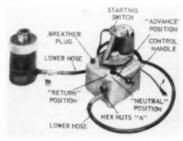
. . for more details circle 248, page 16

2525 Gardner Road, Broadview, Ill. The new unit, known as No. 789 CO, will raise a 60-ton capacity Simplex "Re-Mo-Trol" ram 5 times faster than a hand pump — lifting the ram 1 in. in half a minute compared to 2 minutes with a hand pump.

The electric pump has a displacement of 30 cu. in. of oil per minute at 10,000 P.S.I. compared to a hand pump's displacement of 6 cu. in. per minute at ap-

proximately 30 strokes.

The pump has a built-in ½ hp 115V 60 cycle AC/DC universal motor and a two-speed automatic changeover. It has a built-in safety by-pass valve and a selector valve which reverses plunger on two-way rams. The pump can be turned off or on without loss of travel of ram plunger. Weight 62 lb. The oil reservoir is 6 qt. full; 4½ qt. working capacity.



Hydraulic Power Pump

For more information circle 119 on Service Coupon Page 16 and mail now.

New Tractor Shovel Features Versatility

A new tractor shovel for new long track Cat. D2 tractors, introduced by Uulrich Manufacturing Co., Roanoke, Ill., was designed especially for those who require a low-cost, high production unit capable of handling many jobs.

This No. 2 tractor shovel is matched to the special D2 Tractor, with long non-oscillating tracks, built specifically for shovel work, and is powered by the Caterpillar No. 44 hydraulic control. The bucket has 35° of tip back at ground level, dumping height of more than 10 ft., dumping reach of nearly 3 ft. and a discharge angle of 80°. Careful consideration has been given to proper balance and horsepower-to-weight distribution. A single lever, conveniently located, controls lifting and dumping.



No. 2 Tractor Shovel

For more information circle 120 on Service Coupon Page 16 and mail now.



New OTC Power-Twin Rams

New Rams Increase Speed, Power, Efficiency

Faster operation, greater strength and efficiency are claimed for new models of OTC Power-Twin center hole rams, announced by the Owatonna Tool Co., 435 Cedar St., Owatonna, Minn.

The new features are incorporated in all models. The ram body has been reinforced with ribs providing additional strength to take the tremendous pressured developed. Solid construction between the cylinder also strengthens each unit and a new, heavier, lower frame bracket permits more flexibility in mounting the ram.

A new four spring mechanism provides faster and more positive ram retract action. Both the piston and the piston seals have been redesigned to offer greater efficiency and longer life.

OTC Power Twin rams are light, compact, permitting their use in confined quarters. Rams are made in 17½, 30, 50 and 100 ton capacities.

For more information circle 121 on Service Coupon Page 16 and mail now.

Carbide Bonded, Diamond Blades

A new line of carbide bonded, diamond blades especially designed for economy, and high-speed wet cutting of abrasive blocks, such as Haydite, Waylite, cinder block, concrete block and Gra-



New Carbide Bonded Diamond Blade

neer block has been developed by Consolidated Diamond Tool Corporation.

Because of the new blade's longer life and high-speed cutting features, it is stated to have already found great favor with block manufacturers for block salvaging at the plant, and also "on-theioh" contractors and masons where block is used for finished wall construction. In both cases all-time highs were claimed in economy and the cutting of labor costs.

For further information and prices write to John Dunlavy, National Sales Manager, Consolidated Diamond Tool Corporation, 320 Yonkers Ave., Yonkers, N.Y.

> For more information circle 122 on Service Coupon Page 16 and mail naw.

Tow Attachment for Tandem Roller

A towing attachment for its new 3-5 ton tandem roller is now being offered by Huber-Warco Co., Marion, Ohio. The attachment can be either supplied mounted on the roller or it may be purchased separately and easily bolted on in the field. It consists of a towing hitch with a built-in hydraulic jack; axle and wheel assemblies; and axle carriers for both working and towing positions.

With the attachment, the Huber-Warco 3-5 ton tandem can be converted to a highly portable unit for quick movement from job to job. The change-over from working to transport position and back

takes only a few minutes



Tow Attachment on Roller

Features of the attachment include 7.50 x 20 tires, wheels mounted on tapered roller bearings and an 8-in. vertical adjustment at the hitch to provide a level travel position for the roller. A power hydraulic jack in the hitch assembly is optional.

For more information circle 123 on Service Coupon Page 16 and mail now.

Crane Carriers

New 8-ton and 10-ton 6 x 6 crane carriers are now in production by Federal Truck Co., division of Napco Industries, Inc., 834 North 7th St., Minneapolis 11, Minn.

According to Napco engineers, the revolutionary cab and special sheet metal design of the new Federal Crane Carrier is distinctive and provides extra visibility. The frame rails are heavy duty 8 in. x 12 in. 45-lb. wide flanged beams in the 8-ton unit and 12 in. x 12 in. 65-lb. wide flanged beams in the 10-ton carrier. This extra frame strength, together with a stronger 10,000 lb. front driving axle and a 28,000 lb. rear bogie, are stated to give the ruggedness needed



Federal New Crane Carrier

for the toughest crane, shovel or backhoe assignment.

The new carrier is powered by a 265 cu. in. Chrysler gasoline engine. Using a four-speed transmission and dual range transfer case, the carrier has 8 forward and 2 reverse speeds. It is equipped with 7.50 x 20, 8-ply tires. Optional equipment includes front and rear outriggers, rear fenders, power steering, heater and defroster, and 8.25 x 20 or 9.00 x 20, 10-ply tires.

For more information circle 124 on Service Coupon Page 16 and mail now.

1 1/2 Ton Truck Has Torque Converter Drive

A new 18 cu. ft., 1½ ton capacity construction materials handling truck with torque converter drive has been introduced by the Prime-Mover Co., Muscatine, Iowa.

The new truck has a top speed of 12 miles per hour. It is powered by a Wisconsin 15 hp air cooled engine, heavy duty Model TFD with electric starting, direct coupled to a transmission consisting of a three element torque converter and directional change clutches. Engine and transmission are coupled to the differential with an automotive type drive shaft. No belts or chains are used.



Model M30 Prime-Mover

For more information circle 125 on Service Coupon Page 16 and mail now.

Bulldozer Tilting Attachment

A new hydraulically actuated bulldozer tilting attachment for use with No. 98 and 88 bulldozers, announced by Caterpiller Tractor Co., Peoria, Ill., is designed to give D8 and D9 tractors increased versatility on such jobs as ditching, pioneering roads on hillsides, digging rocks and other applications which require frequent tilting of the blade.

Heart of the new tilting attachment is a large hydraulic cylinder which replaces the left bulldozer blade brace. With the right-hand brace adjusted to its neutral position, either corner of the No. 98 blade can be raised approximately 28 in. above ground level by retracting or extending the tilt cylinder. On the No. 88, this figure is approximately 24 in.

Additional tift can be obtained by extending or retracting the screw-typeright-hand brace. New bulldozer trunnions, designed to take full advantage of the maximum available tilt, are furnished with all new No. 9S and 8S bulldozers.



Left Side View of Hydraulic Tilting Attachment

For more information circle 126 on Service Coupon Page 16 and mail now.

Formgrader Has New Features

New model formgrader of Cleveland Formgrader Co., Mills Road, Avon, Ohio, has several new features. These include power steering, hydraulically operated cutter lift bar and an improved self-starter. This machine enables one man to cut form trench to exact grade and is stated that in six hours it is possible to cut 6840 lin. ft. of form trench. Inclusion of power steering adds materially to ease of handling, increases accuracy and requires less attention from operator.

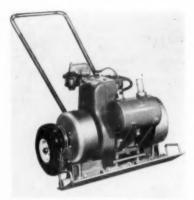


New Improved Cleveland Formgrader

For more information circle 127 on Service Coupon Page 16 and mail now.

Portable Gasoline Powered Tamper

A new portable, gasoline powered compaction tool, the Vibra-Tamp, announced by Barco Manufacturing Co., Dept. V-30, 500 Hough St., Barrington, Ill., is stated to combine positive impact, imparted by high speed rotating counterweights, with intensive vibratory effect to produce maximum compaction of granular fill materials and bituminous surfacing. It is stated, one man can tamp up to 750 sq. yd. of surface per hour using lifts of as much as 12 in.



New Barco Vibra-Tamp

The Barco Vibra-Tamp embodies an ingenious operating principle. The 27 in. tamping shoe delivers impact energy generated by dual rotary counterweight fly wheels. The shoe is offset slightly ahead of these flywheels, thus producing a forward thrust that causes the machine to "walk" forward. The traveling speed is adjustable up to 50 ft. per minute on level surface.

For more information circle 128 on Service Coupon Page 16 and mail now.

Diaphragm Pump

A new diaphragm pump, introduced by Gen-A-Matic Corporation, 14741 Bessemer St., Van Nuys, Calif., is designed specifically for water laden with mud, sludge, sewage, pebbles and other foreign bodies.

Special features of the new Gen-A-Matic pump includes the long-life diaphragm, non-clogging valves, and the use of anti-friction bearings in the pump rod and in the main transmission. Transmission is enclosed for long, rugged service life and a minimum of maintenance.

Pump is powered by a one-cylinder. 4-cycle air-cooled gasoline engine with high tension magneto and impulse coupling, oil bath air cleaner, fuel tank and hand crank. Capacity is 6,000 gal. per hour.



Gen-A-Matic Diaphragm Pump

For more information circle 129 on Service Coupon Page 16 and mail now.



as the job moves...



SO MOVES THE PLANT!

Move it today—operate it tomorrow! And a batch plant too! Standard's revolutionary new portable batch type asphalt plant has been developed so that contractors can handle hard-to-reach paving jobs profitably. Consider what this remarkable unit can do:

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- Gives maximum portability without loss of ruggedness.
- 4. Saves money through quick set-up and one man operation.
- 5. Saves time getting on and off the job; entire unit including hot and cold elevator can be set up in just a few hours.



Standard's portable asphalt plants provide the same experienced engineering and dependability as are found in Standard's large semi-portable Model RB asphalt plants. Both are backed by 53 years of development, knowledge and experience.

Write for catalog.

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STANDARD STEEL CORPORATION

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for more details circle 245, page 16

Two Heavy-Duty Levelers

Two new, heavy-duty levelers, announced by Gurries Manufacturing Co., 1720 South First St., San Jose, Calif., are for use with tractors of 20 hp or larger. The GL-8 is an 8 ft. machine with a 2 cu. yd. bowl, and the GL-10 takes a 10 ft. cut and has a 2½ cu. yd. bowl. Bowl is hydraulically raised and lowered by a single hydraulic ram. Hydraulic power is furnished by any single valve tractor mounted power control unit. Cutting depth is easily adjustable for leveling or digging.



New Gurries Leveler

For more information circle 130 on Service Coupon Page 16 and mail now.

Hydraulically Operated Diamond Drilling Machine

A new hydraulically operated concrete and masonry drilling machine has been announced by Molco Drilling Machines, Inc., 1100 20th St., N.W., Washington 6, D.C. This Model V Mole machine incorporates a swivel head that allows holes to be drilled at any angle. Special diamond faced self-sharpening core bits drill through reinforced concrete, tile, asphalt and other hard building materials. A compact hydraulic system feeds the drill bit into the work surface automatically. Holes from 1 in. to 14 in diameter are stated to be easily cut through reinforced concrete with this machine which can be driven with either an electric motor or gasoline engine.



Model V Mole Concrete Drilling Machine

For more information circle 131 on Service Coupon Page 16 and mail now.

42 in. Conveyor-Screen Plant

Pictured here is the newest and largest addition to the line of portable conveyors and vibrating screens produced by the Kolman Manufacturing Co., Sioux Falls, S. Dak. This model 101 conveyor features a 42 in. wide belt, is 50 ft. in length, mounted on dual tires and can be



Kolman New 42 in. Conveyor-Screen Plant Loading 20 Ton Trucks

equipped with a full line of accessories to comprise a complete portable conveyor screen plant.

The single deck vibrating screen shown has been designed in proportion to the size of the 42 in. plant. Designated as the Model SB-90, it is 9 ft. long by 54 in. wide and features the "Floating

Action" characteristic of all Kolman single and multiple deck vibrating screens.

The plant can also be equipped with a double or triple deck screen in order to produce various sizes of material in one operation and spray bars can be added to provide an efficient, low cost and highly productive portable washing plant. Any variety of feeding accessories is available to round out the complete and fully portable conveyor-screen plant.

For more information circle 132 on Service Coupon Page 16 and mail now.

General Purpose Contractor's Dump Bodies

A new SD series of general purpose contractor's dump bodies, of 2 cu. yd. payload capacity and designed for mount-



Model SD-12 2 cu. yd. Dump Body with Fixed Sides

ing on trucks in the 4,200 to 10,000 GVW range, has been announced by Hercules Steel Products Co., Galion, Ohio. The new bodies are available in both fixed and removable side types. Model SD-12, with fixed sides, features one piece floor and side construction, flanged top rail, full length rub rails, boxed rear corner post and a flange-reinforced head. Body understructure consists of 3 in. channel crossmembers flanged and welded to 3 or 5 in. channel longitudinals, depending on hoist model. Model SD-1 is similar in construction and has the added advantage of fully removable sides and rear corner posts. Offered in 8 ft. length, both models are 78 in. wide.

SD series bodies are designed for mounting with Hercules Model 330, 340, and "K" hoists, of 4 to 7 ton capacity, on trucks having 60 in. cab-to-axle dimension.

For more information circle 133 on Service Coupon Page 16 and mail now.

Loader Approved for International Tractor

The W7 tractor loader and W30 backhoe of Wagner Iron Works, 1905 South First St., Milwaukee 1, Wis., have been approved for the International "400" tractor. Both units have been approved by the International Harvester Co. and measure up to the capacity of the International "400" tractor.

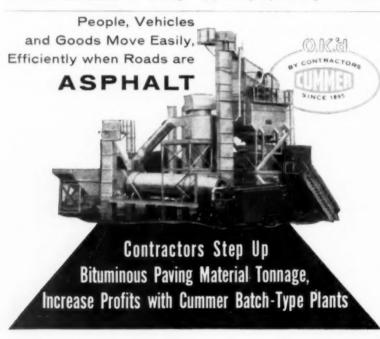
The Wagner W7 loader is a heavyduty loader designed specifically to match tractor power on tough industrial loading jobs. The loader features "Step In" frame design that permits easy sidemounting plus convenient use of additional tractor equipment. In addition, powerful down-pressure side cylinders give the loader greater digging and lifting power.

The Wagner W30 backhoe, digs to a clean depth of 12 ft., and lifts a full bite up to 9 ft., 3 in. It reaches a full 16 ft., and lifts a full bite up to 9 ft., 3 in. It reaches a full 16 ft. from the swing axis on a 160° arc.



Wagner Backhoe and Front End Loader

Service Coupon Page 16 and mail now.



Rugged, reliable Cummer Batch-Type Plants are engineered and built to turn out big tonnages of specified mix with no variation throughout production. Whatever contractors and engineers want in bituminous paving material, Cummer Plants can be depended on to deliver maximum production at lowest cost.

Here's what Sam Finley, Inc., Oceana, Virginia, whose 100-ton per hour capacity Cummer Stationary Plant is shown above, writes: "To keep ahead of competition today, a contractor has to meet schedules on time with material as ordered—no excuses. We're always sure of complete customer satisfaction and a steady, profitable operation with our Cummer Batch-Type Plant."

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Manufacturers' Literature

Drag Scrapers

A new catalog A issued by Sauerman Bros., Inc., Dept. R-18, 620 S. 28th Ave., Bellwood, Ill., gives full details and specifications on Drag Scraper machines. Parts 1 and 2 cover standard installations from ½ to 3-cu. yd. Parts 3 and 4 describe rapid shifting Drag Scrapers in sizes from ½ to 5-cu. yd. Part 5 shows track cable machines and tower excavators. Each part includes several pages of job photos and a typical layout which graphically illustrates the items specified. The pictures show Drag Scrapers working in various materials.

For more information circle 135 on Service Coupon Page 16 and mail now.

New R-15 Rear-Dump Euclid

The New R-15 rear-dump Euclid is described in a new 8-page catalog released by Euclid Division, General Motors Corporation, Cleveland 17, O. Rated payload of the unit 15 tons with standard 14.00 x 24 tires. . . 18 tons with optional 16.00 x 25 tires. The 3-color catalog illustrates the major design and operating features of the new rear-dump model for off-highway hauling. It also provides performance data and general specifications.

For more information circle 136 on Service Coupon Page 16 and mail now.

Dredge Pump Applications

A new booklet of facts on 11 different sand and gravel operations in case-history form is available from Department A, American Brake Shoe Co., 230 Park Ave., New York 17, N. Y. The 2-color, 16-page application file is illustrated with photos of the dredges at work and the men who run them. Operators themselves testify to the performance of Amsco hydraulic pumps in handling higher tonnages with less maintenance and downtime.

For more information circle 137 on Service Coupon Page 16 and mail now.

Diamond and Shot Core Drilling Manual

A 36-page illustrated manual of methods and practice entitled "Basic Procedures of Diamond and Shot Core Drilling," has been published by Acker Drill Company, Inc.

The book is profusely illustrated with drawings and photographs, most of which were taken directly in the field and depict authentic operating conditions. The text is written in non-technical language. It represents considerable research and compilation of data on both diamond and shot core drilling. This book is of value to both highway departments and contractors doing pavement and other types

of core drilling, as well as subsurface in-

Price \$1.00. Send to Acker Drill Company, Inc., 725 West Lackawanna Avenue, Scranton 3, Pennsylvania. This sum will be refunded by Acker to any reader not satisfied with the publication.

> For more information circle 138 on Service Coupon Page 16 and mail now

How End Sections Improve Culverts

How end sections improve culverts and cut costs is described in a new 4-page bulletin from Armco Drainage & Metal Products, Inc. Some of the points discussed and illustrated are appearance and safety, no crosion problem, and low-cost installation. Copies are available from the company's Product Information Service in Middletown, Ohio. Ask for ES-12255.

For more information circle 139 on Service Coupon Page 16 and mail now.

Concrete Construction Forms

Time and labor saving applications, uses and features of Atlas Compo Forms for concrete construction are outlined in a catalog by Irvington Form and Tank Corp., 20 Vesey St., New York, N.Y.

For more information circle 140 on Service Coupon Page 16 and mail now. (Continued on page 144)



Indiana Toll Road Contractors use STANDARD Lubricants and Fuels

Prime contractors and sub contractors on the project choose STANDARD. Reason: (1) top quality (2) service

The Indiana Toll Road is the biggest construction project ever undertaken in the State of Indiana. All parts of the job are going at a high production rate. To maintain such a record, contractors must get top performance from equipment. Standlube Motor Oils, Standard Diesel Fuels and Standard Gasolines help them get this kind of performance—with plenty to spare—from all types of equipment, under all operating conditions, in any weather.

To keep on schedule, supplies of lubricants and fuels have to be where needed at any hour, day and night. Standard Oil maintains stocks at the job site for every one of the contractors served. Equipment never waits for fuel or lubricants.

This is big construction. Small wonder that on this project from borrow pit and fill, from pile driver to batching plant, construction equipment uses Standard lubricants and fuels. Big job or small, let Standard be your supplier. In any of the 15 Midwest and Rocky Mountain states, Standard Oil automotive lubrication specialists are nearby and ready to help you. Call them or write Standard Oil Company, 910 So. Michigan Ave., Chicago 80, Ill.

Equipment Superintendent, Lewis A. "Shorty" Martin (right), and Standard automotive lubrication specialist O. H. "Grit" Collier discuss parts maintenance at Western Contracting Corporation field shop. Field technical service such as this is old stuff to Grit Collier. He has been doing such work for 10 of his 22 years at Standard Oil. Grit is a graduate of the Standard Oil Sales Engineering School. Customers find this experience and training pay off for them.







Rieth-Riley Construction Co., a prime contractor, sets fast pace for equipment, cuts time out for lubrication maintenance by using lube truck.

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Indiana Toll Road traverses state from Hammond, Indiana to junction with Ohio Toll Road, a total of 153.3 miles of four lane highway. Scheduled completion date... Fall 1956.

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D-6, Co. #22, S/N 9U4634, cable controlled, angle blade. Good	
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D-6, Co. #404, S/N 9U2719, w/hy-	
draulic controls and angle blade.	5,800
D-6, Co. #226, S/N 9U13549, w/	
hydraulic controls, angle dozer	11,200

CATERPILLAR DOZERS D-4's (3)

D-4, Co. #265, S/N 7U19136 w/ hydraulic controls and angle	
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D-4, Co. #316, S/N 7U11272, w/ hydraulic controls and angle	
dozer	5.350
D-4, Co. #369, S/N 7U19254, w/ hydraulic controls and angle	,,,,,,
dozer	6,300

CATERPILLAR DOZERS D-2's (2)

D-2, Co. #340, S/N 4U4919, w/	
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dozer\$	3,500
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Galion 5-Ton, 2 wheel, S/N 16877, Model #T3G; Wisc. Motor V-4, Co. #23	2,550
Galion 10-Ton roller; Co. #411. S/N T-8-12-G-32373	4,700
Huber 12-Ton, (3) wheel roller, Co. #37, S/N 10-449, powered w/Hercules diesel engine, S/N Z-389405. Excellent condition	5,600

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Tractair, Co. #384, S/N 514555, Model 105G	2,380
Tractair, Co. #535, S/N 546509, Model T-A, Excellent condition	2,950
600 C.F., CD-2-C, Co. #484, Port- able mounted on four (4) pneu- matic tires, S/N 1T339, powered w/Caterpillar diesel engine	9,100
500 CS-2-C, Co. #485, Portable mounted on four (4) pneumatic tires, S/N 313x205, powered w/ Caterpillar diesel engine	9,100

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Caterpillar D6-2CY, Bucklet loader, Co. #331, S/N 10A-426, 74" gauge tracks	314,780
Allis Chalmers, HD-5W/ripper at- tachment, Co. #489, Model HD5G, S/N 23113, shovel at- tachment #TS59679	7,450
Trojan rubber tired bucket loader model #LC100, Co. #222, S/N C-150, International gasoline en- gine S/N 701	6,900

DITCHER

Ditcher (Barber-Greene) Model	
46C, S/N 44-52-200, Co. #24,	
powered w/Minneapolis Moline	
engine 64H.D	

GRADERS

Galion, tandem, Model 118, S/N MD19761, Co. #318\$	8,200
Caterpillar Model 112, S/N 9K- 5123, Co. #225	2,800
Caterpilar Model 212, S/N 97- 1863, Co. #412	3.950

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Buckets % to 41/2 C.Y.

Pumps 11/2 to 10".

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S/N 16020, Co. #10, powered/GMC 371 diesel engine, w/electric starter; w/independent high speed boom hoist; w/additional worm gear boom hoist; 1 NW #25 pullshovel attachment S/N 13522P. Excellent condition — 2 years old..... 16,750

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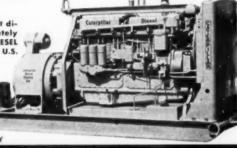
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- CONCRETE EQUIPMENT -

6—REX 3 cu. yd. Mixers, 4½ cu. yd. Agitat-ors, High Discharge Moto-Mixers, powered with Waukesha Gasoline Engines — Con-dition Good.

4—SMITH 3 cu. yd. Mixers, 4½ cu. yd. Agi-tators, High Discharge Truck Mixers pow-ered with Continental Gasoline Engines— Condition Good.

3—REX 2 cu. yd. Mixers, 3 cu. yd. Agitators, High Discharge Moto-Mixers powered with Waukesha Gasoline Engines — Condition Good.

I—REX 4½ cu. yd. Mixer, 6½ cu. yd. Agitator, High Discharge Moto-Mixer powered with Chrysler Gasoline Engine—Condition Good.

Used KOEHRING Model 16E — 1 B Dual Drum Pover powered with GMC Model 2-71 Diesel Engine, New in 1951 — Good

- DRAGLINES AND BUCKETS -

1—Shovel Front End for SARGENT Model 34
—Condition Good.

—Condition Good.

—Shovel Attachment for 250 KOEHRING —
No. C4908-4131 — Condition Like New.

—PAGE Model RC I cu, yd. Drogline Bucket
No. 4-3255 — Condition Excellent.

—KIESLER 11/2 cu, yd. Material Handling
Clamshell Bucket — Condition Very Good.

% cu. yd. OMAHA Lightweight Dragline Bucket — Condition Good

BITUMINOUS EQUIPMENT -

1—BROS Model CS Portable Oil Circulator on 2/pneumatic tires — No. 2447 — Condi-tion Like New.

Tion Like New.

1—BROS Model 26T Steam Generator on 2/
pneumotic tires — No. 3129 — Condition
Very Good.

1—BROS Model 26T Steam Generator on 2/
pneumotic tires — No. 3135 — Condition
Very Good.

Very Good.

CLEAVER-BROOKS — DS-3 — 42 hp Steam Generator — No. 4612-53 — Con-dition Very Good.

1—NEW — TRU-LAY ASPHALT OR ROCK PAVER — COMPLETE WITH CUT-OFF PLATES — No. 53-89 — MACHINE IS NEW BUT SHOP WORN—PRICED TO SELL.

1—CLEAVER-BROOKS — 85 hp Gasoline Engine driven, automatic controlled Steam Generator — Skid mounted — Condition

BUFFALO-SPRINGFIELD KX-16 (9-14 ton) Three Axle Tandem Roller, No. 22712 — Located at Rapid City, South Dakota — Condition Very Good.

BUFFALO-SPRINGFIELD — 5 Ton Tandem Roller No. 11053 — Condition Fair to

1—BARBER-GREENE Model 879A Finishing Machine, 12' Width, Powered with LeRoi Gasoline Engine — Condition Overhauled.

- MISCELLANEOUS -

Model 358 Car Unloader, Wisconsin TF Engine — No. 358-49-42 — Condition Good.

 MaRER-GREENE — Model 363 — 35' Portable Conveyor — Wisconsin VE4 Engine No. 363-49-53 — Belt not in best of condition, otherwise machine in Good Condition.

1—BARBER-GREENE — Model 661 Gooseneck Coal Conveyor, Self-propelled — Electric powered, complete with electric cable — Condition Good.

PIONEER Portable Conveyor Model 40 — with hopper and grizzly with or without power — Condition Good.

AMERICAN Portable Hoisting Tower com-plete with hoist powered with Wisconsin VE4 Gasoline Engine — Condition Fair to Good.

INTERNATIONAL TD6 Tractor with BUCY-RUS-ERIE front end Loader No. 56476 — Machine has new sprockets — Rollers Re-bushed, Hydraulic system completely over-hauled — Condition Good.

3—FERGUSON Sheepsfoot Rollers — Drum — 48" Diameter Drums — Co Very Good.

1—BROS. — 45R — Pneumatic Tired Roller —Condition Very Good.

1—HOBART — 300 AMP Electric Motor Driven Welder — Condition Very Good.

FUCHS-CLAYTON MACHINERY CO. 901 SOUTH 40TH STREET OMAHA, NEBRASKA

ATTACHMENTS AVAILABLE

Northwest—Bucyrus Erie—Lima—Marior Link Belt—Lorain—P&H—Manitowo Shovels—Backhoe—Clam Drag — all JAMES C. FRENCH 226 Berry Pkwy. - Talcott 3-4927 PARK RIDGE, ILLINOIS

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Christian 2D Hoist & Swinger, 138 HP Buda Diesel Engine. 15,000 # SLP. 2 100 HP Lucey Portable Horiz. Fire-Box Boilers. 200 lbs. Oil Fired. ASME. 25 ton American Steel Guy Derrick. 30 Ton Steel Stiffley Derrick 125 bm. 25 ton Ohio Diesel Loco. Crans 1947. 1/2 yd. Northwest No. 6 Diesel Crane. 1948. 1/2 yd. Bucyrus-Eric 38-B Diesel Crane 1948. 5 yd. Manitowoc 4500 Shavel-Draeline. 75 KW Cat. Diesel Gesserator 3/60/440.

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32' diameter Wemco Hyrdoseparator, powered by 71/2 HP electric motor, 60" gear diameter, handwheel worm lifting device, 72" discharge cone, vari-pitch drive. Rake speed: .75-1.5 RPM. Approx. weight, 40,000 #. Price \$9,000 F.O.B. Dallesport, Wash.

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South San Francisco, California

Phone: Plaza 6-0300, Ext. 125

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1953 Cat 12 Grader #8T-10954\$	8500
1953 Galion 10-ton 3-wheel Asphalt Roller, Diesel	5500
1953 Jaeger 600CFM Portable UD- 24 Diesel	6000
Osgood Mdl. 50 Backhoe, dragline. Clamshell	5250
1-A-C HD-7 Hyd. Dozer, Cab	3000
1952 Lorain TL-25K, Cat. Diesel 315, 45' Boom, Fairleads	6000
1—Cat. D-8 #8R-9938, Cat. 25, Angle-dozer, Completely Rebuilt	8500

THE FOLLOWING ARMY SURPLUS LIKE NEW

Barber Greene B2A Crawler loader	6000
Bay City 180 T-50 Truck Crane	17000
Bay City 20 Crawler, gas	5000
Link Belt LS-85 Crawler, Cat. Die- sel, 40' Boom. 300 Hours	11000
NW-25 Crawler, Cat. Diesel, 45' Boom, Fairleads	8500
Osgood 800 1½-yd. Cat D-13000 Diesel, 340 hours	17000
Jaeger Doubledrum Hoist W/40' Pile Driving Tower	2000

ATTACHMENTS

Lima 802 Hi-Front; Lima 34 Shovel; Byers 83 Shovel; Backhoe; Lorain 40 Backhoe; Bay City 20 Shovel Front; B-E 37B Shovel Front; Bay City 65 Dippers.

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New LeTourneau Pan & Dozer Bits

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No. Pr	ice Pr	ice Der	cription
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Radiator guare	s for TD9	Internation	al, com-
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Each			\$20
Roller seals fo	r D8 - D7	- D6 - D	4 Cater-
pillar, 25%	off list pric	e.	
New 13/4" rock	bits, screw	on type. E	lach 25c.

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5 LeTourneau-Westinghouse C Tournamatic Tournapulls, late 1954 Models — average 1250 hours use.

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Bucyrus Erie 38-Bs, 518s, 548s, cranes—drags shovels, diesels, wide long cats — long booms.

booms
Marien, Keehring, Link Belt and Lerain models cranes — drags — shovels, widelong cats — diesels. Also backhoe equipped machines all types.

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Above equipment located in South Carolina

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300 ton 4 Compartment Bin

-Barber-Greene Conveyor 24" x 210"

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Practically new (mixed only 10,000 c.y.). 28-S stationary tilting mixer purchased in 1953. With 20 H.P. electric motor, starting compensator, batching chute, batch hopper and frame, batch meter and lock. Located in Chicago.

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Heavy duty, tubular steel, single-well hoist tower 52 ft. high, with one c.y. skip bucket and single drum hoist powered by 20 H.P. electric motor with starting eompensator. Located at Cumberland, Maryland.

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Model 10 B3 McKiernan-Terry Steam Double-Acting Pile Hammer with bell bottom anvil block, also flat block. Located in Chicago.

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Complete, excellent condition — used only 4 months. Also fits 302 Kochring.

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All types of heavy work tires. Excellent condition.

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LOW BED SEMI-TRAILERS, 10 TO 100 TON

I BEAM - LEVEL - DROPDECK

Please give location; make; model; year; condition; width, length, height of loading deck; gooseneck type; rear axle type; tire size and number.

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PILE DRIVING EQUIPMENT

M-T 10B3 Pile Hammer with cup anvil, flat anvil and driving block and yoke for concrete piling — like new condition. Cost \$8,100. Sell. \$4,00 50 Foot Leads, 4000#, cost \$1,200

Sell

Barge, portable, 100 ton capacity, 28'x34', assembled. Navy pontoons. Sell 2,4

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AIR COMPRESSORS

I-R; Model KAC-16; Cap. 210 C.F.M. at 100 Lbs. Serial #40G-37652 (1949) Waukeshaw Gasoline Eng. Model #140 GS; Mounted on Cats; Self Propelled by Air Motors; Wt. 9000 Lbs, Used very little; 95% new, Illustration available.

Davey; Model 105VD6; Series 08; Serial 2V62053; Hercules Eng. Model #QXD5; Actual Cap. 165 C.F.M. at 100 Lbs. Skid Mounted; Late Type; Less than 100 Hrs. use; Photo available.

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Loads top soil 800 to 1,000 cu. yds. per hour. Sidecasts 1,500 to 2,000 cu. yds. per hour. Model C301, 48" belt, 27' conveyor, 42" cutting disc plow, driven by D318 Caterpillar diesel engine.

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H. O. PENN MACHINERY CO. INC. 140th Street & East River Bronx 54, N.Y.

Manufacturers' Literature

(Continued from page 131)

Highway Signs

A 12-page booklet containing information on Kaiser aluminum highway signs and railroad crossbucks has been published by Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, Calif. The illustrated booklet lists sizes and availabilities of various types of sign blanks, including octagon, round, rectangular, square and diamond shapes. New design features of Kaiser Aluminum's extruded highway signs and railroad crossbucks are described. Also included is detailed information on methods of finishing aluminum sign panels by applying reflective sheeting, paint baked enamel and porcelain enamel.

For more information circle 141 on Service Coupon Page 16 and mail now.

Heavy Duty Gooseneck Trailers

A new and comprehensive 44-page catalog on its line of trailers has been issued by Rogers Brother Corporation, Albion, Pa. Some idea of the scope of this publication is given by the fact that it contains 75 specifications of trailer models. Ten types of trailers are featured in the catalog. Features of each of these types are illustrated and described. In

addition the catalog contains a section on historic Rogers developments from the first low bed trailer in 1920 to the latest three axle tandem trailers available in 30 tons to 90 tons capacity. Sections on dollies, safety fifth wheels, equipment available at extra cost and special trailers are included in the catalog. This is a catalog worth having by anyone interested in trailers.

For more information circle 142 on Service Coupon Page 16 and mail now.

Three Models "Euc" Scrapers

Three catalogs describing the overhung engine line of "Euc" scrapers, Models S-7, S-12 and S-18, have been published by Euclid Division, General Motors Corporation, Cleveland 17, Ohio. Each of the three-color catalogs contain 8 pages of cut-a-way views of major components and photographs that help to explain the accessibility and operating features. Condensed specifications are included to provide data on engines, transmissions, tires, scraper controls, weights and dimensions. These also show a performance table showing speeds and grade ability. Illustrations and action views show how hydraulic lever action of apron, bowl and ejector provides fast, independent control of all scraper operations. Except for one short length of cable on the apron lift, there are no sheaves, pulleys or cables. Catalog 505 covers the S-7 scraper which has a payload capacity of 7 cu. yd. struck, 8 yd. at 3 to 1 slope, and 9 yd. heaped at 1 to 1. The Model S-12, described in Form

506 carries 12 yd. struck, 14 yd. heaped at 3 to 1 and 16 yd. at 1 to 1. Torqmatic Drive that consists of torque converter with semi-automatic transmission is a feature of the S-18 Scraper described in catalog 507. This power train eliminates manual shifting and permits changing from one speed range to another under full power. This model has an 18 yd. capacity struck and rated payloads of 21 yd. heaped at 3 to 1 and 25 yd. at 1 to 1 slope.

For more information circle 143 on Service Coupon Page 16 and mail now.

Electric Generating Plants

A new 8-page, 3-color catalog describing its complete line of electric generating plants, released by D. W. Onan & Sons, Inc., Minnneapolis 14, Minn., has been carefully designed to make it easy for the reader to select the proper type of generating plant and necessary accessories for his particular needs with a minimum of effort. Laid out in simple two-page spreads, each separate series of Onan electric plants . . . 1-cylinder air-cooled models; 2-cylinder air-cooled models; 4, 6 and 8-cylinder water-cooled models and air-cooled diesel models, are listed in complete detail. For example, one spread shows the entire range of single-cylinder, air-cooled, gasoline-driven Onan electric plants in alternating and direct current models, with both the size of the unit and the starting method listed. Below each photo spread is a de-tailed "Model Selection Guide," giving model number, description, starting

WHAT ABOUT YOU, MR. READER?

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Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. Your name might be cut from the mailing list.

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Superior lubricants designed specifically for your equipment plus D-A Personalized services including:

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. . . for more details circle 202, page 16

method, type of engine and dimensions and weights of each plant. Optional accessories available for the units listed on each spread are described and pictured. Individual specification sheets for all models and information on Onan's new exclusive VACU-FLO cooling system are listed as being available.

For more information circle 144 on Service Coupon Page 16 and mail now.

Sprocket Pulling and Installing Sets

Of special interest to contractors and all users of track type industrial tractors, is the new sprocket puller bulletin No. HYS55-1, released by the Owatonna Tool Co., 435 Cedar St., Owatonna, Minn. The new bulletin fully describes both 50 and 100 ton sprocket pulling and installing sets designed for Caterpillar, International Harvester, and Allis-Chalmers crawler tractors. It lists in detail all of the component parts of each set, illustrates the various components of each set and in addition shows actual illustrations of the various pullers in operation on the particular make tractor it was designed for.

For more information circle 145 on Service Coupon Page 16 and mail now.

Utility Spray Tanks

A new 8-page catalog (Bulletin CG-5) describes and illustrates truck mounted, 2-wheel trailer, and 4-wheel trailer utility spray tanks of Littleford Bros., Inc., Box 75, 454 E. Pearl St., Cincinnati 2, Ohio. Littleford's model 101 utility spray tanks combine three operations in one unit: bar spraying, hand spraying and a pouring pot outlet for patching and crack filling. Two types of spray bars are available; the 10-ft. tubular type or the 8-ft. mechanically operated full circulating. Both bars are easily equipped with extensions for a maximum spray width of 12 ft.

For more information circle 146 on Service Coupon Page 16 and mail now.

Cone Crushers

The operation and design features of standard and short head type Symons cone crushers are described in complete detail in a new, 24-page, three-color bulletin (No 247) published by Nordberg Manufacturing Co., Milwaukee 1, Wis. Tables list the more than 40 different crushing cavities that are provided together with their respective feed openings, product sizes and capacities. The features of Nordberg "Stepped Liners" are explained as is the automatic protection provided against tramp iron. Diagrams show the flexibility of arrangement of the crusher.

For more information circle 147 on Service Coupon Page 16 and mail now.



. . . for more details circle 269, page 16



. . . for more details circle 199, page 16



AUGER DIAMETER DEPTH OF BORE

20" and 24" 12" and 16" 16' to 30' 60' to 70'

for drilling in earth, clay, compacted sand and gravel, and soft shale formations.

3", 4½", 6", 8" and 9" up to 125' for drilling the above, plus drilling in hard sandstone formations.

Choose the most desired size auger for each drilling depth, in any vertical drilling operation. The new McCarthy Model 106-24 Vertical Auger Drill handles augers from 3" to 24" in diameter.

Adjust drilling speed properly for various rock and earth formations. Model 106-24 has two output shafts, one speed for earth and one for rock. A gear reducer slows auger rotation for harder rock formations. This gives more torque, or "biting power" in sand rock and soft limestone.



Write for Bulletin M-100

THE SALEM TOOL CO.

With the Manufacturers and Distributors

LETOURNEAU-WESTINGHOUSE PERSON-NEL CHANGES. Jack G. Errion has been appointed assistant to the domestic sales manager of LeTourneau-Westinghouse Co., Peoria, Ill. Errion, who has been serving as sales promotion manager for the firm, will direct the company's sales training program as well as assist W. E. Hendricks, domestic sales manager in domestic sales activities; Kenneth W. Chriswell, Indianapolis, Ind., has been appointed assistant advertising manager. Chriswell has been serving as assistant sales promotion manager of the Adams Division of the company and has been associated with the Adams organization for 22 years; David R. Harvey, who has been a member of the LeTourneau-Westinghouse advertising staff for more than 9 years has been appointed sales promotion supervisor and will be responsible for the direction of the company's sales promotion activities. He will report to Lloyd Rager, advertising manager for the firm; Leland B. Adams will direct the company's export advertising program as export advertising supervisor. At the same time, the company also announced the appointment of Dean A. Frost, formerly American Automobile Association Director of Public Information for the State of Iowa, as supervisor of trade publicity; Walter E. Kohrs who has been serving as trade publicity and publication supervisor will become external publication supervisor and devote his entire efforts to the recently expanded periodical publication program.

CATERPILLAR TRACTOR APPOINTMENTS. Caterpillar Tractor Co., Peoria, Ill., has announced the following appointments: E. C. (Chappie) Chapman as sales manager of the Eastern Division. He formerly was assistant manager of this division. W. E. McCoy, former sales manager of eastern division, has been transferred to the San Francisco office which is headquarters for the two western divisions; Frank Foster, presently assistant sales manager of the Southwest Division, has been transferred to the Peoria office to assume the duties formerly held by E. C. Chapman; Ralph Ehni, now serving as district representative in the Northwestern Division, has been assigned the duties formerly held by Frank Foster.

New Bucyrus-Erie Distributor for Arizona. Road Machinery Co., 716 South 7th St., Phoenix, Ariz., has been appointed distributor of Bucyrus-Erie excavators and cranes for the entire state of Arizona.

Thor Opens New Branch. Thor Power Tool Co., Aurora, Ill., has opened a new factory sales and service branch at 606 West 17th St., Kansas City, Mo. E. C. O'Connell, formerly manager of the Thor branch in San Francisco, has been appointed manager of the new branch.

New Erie Bucket Distributor. Southwood Machinery Sales, U.S. Route 31, Stop 12, Indianapolis, Ind., has been appointed distributor for Erie clamshell buckets for the southern Indiana areas.

RYAN PROMOTED BY FIRESTONE. Charles B. Ryan has been appointed to the newly-created position of general advertising and merchandising manager for the Firestone Tire & Rubber Co., Akron, Ohio. He has been advertising manager since 1942. In his new position he will direct all merchandising activities in addition to the company's advertising and sales promotion.





New Koehhung Distributor for S.E. Texas. Cactus Equipment Co., 2310 Calhoun, Houston, Texas, has been appointed by Koehring Co., Milwaukee, Wis., distributor in Southeastern Texas, succeeding F. S. Ray Co., as Koehring representative in that area. The new distributor will handle the complete line of Koehring heavy duty construction equipment along with products of three Koehring subsidiary manufacturers: Parsons Co., C. S. Johnson Co. and Kwik-Miy Co.

THEW SHOVEL APPOINTS NEW DISTRIBUTOR. Heim Equipment Co., 238 North 131st St., Milwaukee, Wis., has been appointed distributor by The Thew Shovel Co., Lorain, Ohio, for Lorain power cranes and shovels, for all of Wisconsin and all counties on the Upper Penninsula of Michigan.

McCoy Promoted by Timken. Wyn McCoy, formerly district manager, Industrial Division of The Timken Roller Bearing Co.'s Chicago territory, has been promoted to sales promotion manager, Industrial Division at Canton, Ohio.

Marion Appoints Repair Sales Manager. The promotion of John J. Drollinger to manager of repair sales and James P. Baker to assistant manager has been announced by Marion Power Shovel Co., Marion, Ohio. Mr. Drollinger succeeds William A. Dunning, who resigned to become vice-president of Depco Detroit Corp., Detroit construction equipment distributor organization.

THREE PORTER DIVISIONS APPOINT REPRESENTATIVE. Joseph A. Bell has been appointed a district sales representative for three divisions of H. K. Porter Co., Inc.: Leschen Wire Rope, Quaker Rubber, and Henry Disston. His territory includes North Dakota and northern Minnesota, Wisconsin, and Michigan.

SISALKRAFT NAMES NEW VICE-PRESIDENT. Ray H. Anderson has been appointed vice-president in charge of sales for American Sisalkraft Corporation, Attleboro, Mass. He joined the company in 1940. In 1949 he was named manager of the building sales division, and in 1955 was appointed director of marketing. In his new position, he will direct all of the marketing functions of Sisalkraft, coordinating the efforts of sales, merchandising.

Barker Appointed Reilly Sales Encineer. Dana Barker has been appointed sales engineer of Reilly Tar & Chemical Corporation, Indianapolis, Ind. Mr. Barker is now serving the Cleveland, Ohio area where he handles Reilly chemicals and other products offered by the company. He will have his headquarters at the 20106 Kinsman Road office of Reilly Tar & Chemical Corporation in Cleveland.

Masson Joins Jay Corporation. Donald Masson, formerly general manager, Lincoln Plastics, has been appointed sales manager of The Jay Corporation, 168 Hosack St., Columbus, Ohio, manufacturers of earth tamping equipment. GAR WOOD CHICAGO BRANCH SOLD. The Gar Wood factory branch in Chicago, one of the firm's largest, has been sold to J. A. Sloan, formerly district mawager of the Mack Motor Co.'s factory branch in Omaha, Nebr. The new firm will be known as Gar Wood Chicago Truck Equipment Inc. The Gar Wood operation will continue to provide sales and service for Gar Wood and Gar Wood-St. Paul truck equipment in the Chicago area. The sale of the branch, is in keeping with the firm's policy of converting all factory branch operations into private franchises as soon as possible.

CLARK NAMES PARTS AND SERVICE PERSONNEL. Alvin E. York has been appointed manager of parts and service and Alvin L. Arend, parts supervisor of Clark Equipment Co.'s Construction Machinery Division, Benton Harbor, Mich.

New Pioneer Distributor. Sheehan-Bartling, Inc., 817 West 12th St., Sioux Falls, S. Dak., has been appointed distributor for entire state of South Dakota for Pioneer Engineering Works, Inc., Minneapolis, Minn., a subsidiary of Poor & Co., Chicago, Ill.

CUMMINS IDAHO INC., ORGANIZED. Raymond L. Schwartz, Twin Falls, Idaho, has purchased certain assets of Cummins Diesel Sales Corporation, Boise, Idaho, and has organized a new company known as Cummins Idaho, Inc. Temporarily, the new Cummins distributorship will operate at 1204 Front St., Boise. However, plans call for the erection of a new sales and service headquarters at Boise in the near future. Cummins Idaho, Inc., will sell and service Cummins' Diesels in 18 central and western Idaho counties as well as Malheur County in Oregon. Mr. Schwartz has, until recently, been the Diamond T dealer at Twin Falls, Idaho.

Fraser and Wentworth New Worthington VPs. A. William Fraser and Clarence S. Wentworth have been appointed commercial vice presidents of Worthington Corporation, Harrison, N. J. Mr. Fraser, who has been midwest regional sales manager of Worthington since 1951, is in charge of the District Sales Offices at Chicago, Denver, Kansas City, St. Louis and Minneapolis. His headquarters are at Chicago. Mr. Wentworth is sales manager of the central region, with headquarters at Cleveland and responsibility for the district sales offices at Buffalo, Cincinnati, Cleveland, Detroit and Pittsburgh.

New FWD DISTRICT SALES MANAGERS. Douglas E. Reed, Houston, Tex., and Hunter O. Wagner Sr., New Orleans, La., have been named new district sales managers for Four Wheel Drive Auto Co., Clintonville, Wis.

Waldenburg Joins David White Co. A. F. Waldenburg, heretofore, district sales manager in California for Ansco, division of General Aniline and Film Corporation, has been appointed general sales manager of the David White Co., Milwaukee, Wis.

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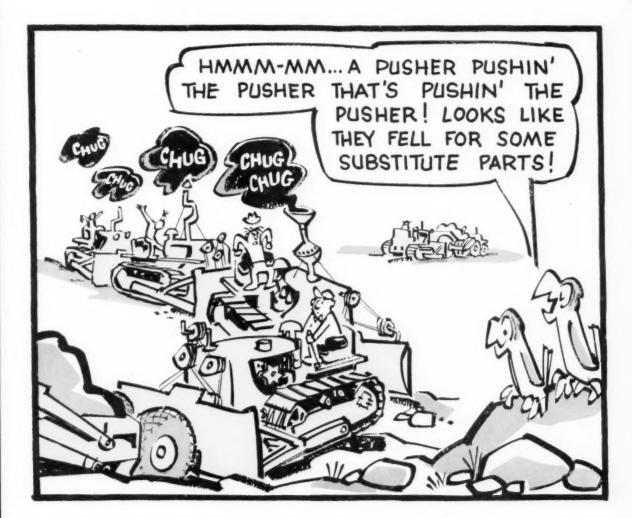
INDEX TO ADVERTISERS

111
Albrecht Co., E. J. 143 Allied Equipment, Inc. 137 Allis-Chalmers, Construction Machinery Division 18, 27 American Bitumuls & Assphalt Company 191
Allied Equipment, Inc. 137
Allis-Chalmers, Construction
Machinery Division 18, 27
American Bitumuls &
Asphalt Company 121 American Sisalkraft Corporation 108
American Sicalkraft Cornoration 109
Andrews Favinment Co. 140
Andrews Equipment Co
Andrews Equipment Co. 142 Armstrong & Co., W. H. 143 Armstrong-Delay, Inc. 135 Arrow Manufacturing Company 106 Asphalt Institute, The 66 & 67
Armstrong-Delay, Inc
*Arrow Manufacturing Company 106
Asphalt Institute, The 66 & 67
Atkinson Company, Guy F 142
Bain Labels
Bain Labels
Construction Equipment Division. 51
Ballenger Paving Co. 142
*Barber-Greene
Barnes Manufacturing Co. 96
Baron Tire Co. 143
Bethlehem Steel Company 3
*Blaw-Knox Company Construction
Construction Equipment Division 51 Ballenger Paving Co. 142 Barber-Greene 115 Barnes Manufacturing Co. 96 Baron Tire Co. 143 Bethlehem Steel Company 3 Blaw-Knox Company, Construction Equipment Division 37 Boyle, C. Morris 139 Boston, Ray 135 Brady & Co., The E. P. 140 Bridgeman, John 136 Bright Day Service, Inc. 140 Brunner & Lay Products 92 Bucyrus-Erie 89
Royle C Morris
Roston Pay
Brady & Co. The F. B
Daidesman John E. P
Bridgeman, John
Bright Day Service, Inc. 140
Brunner & Lay Products 92
Bucyrus-Erie 89
Bucyrus-Erie 89 *Butler Bin Company 36
Caterpillar Tractor Co 7, 52, 59, 60, 61
*Chrysler Corporation, Industrial Engine Division Second Cover *Cleveland Trencher Company, The .104
Engine Division Second Cover
*Cleveland Trencher Company The 104
The state of the s
Clipper Manufacturing Company 91
Copper Manufacturing Company 91
Copper Manufacturing Company 91
Coe, Eugene
Coe, Eugene
*Colorado Fuel & Iron Corporation, The 83 Columbus McKingon Chain
*Colorado Fuel & Iron Corporation, The 83 Columbus McKingon Chain
*Colorado Fuel & Iron Corporation, The 83 Columbus McKingon Chain
*Colorado Fuel & Iron Corporation, The 83 Columbus McKingon Chain
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142
*Colorado Fuel & Iron Corporation, The 83 Columbus McKingon Chain
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son Co. F. 137
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son Co. F. 137
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son Co. F. 137
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son Co. F. 137
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133,
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133, 1155,136,138,139,141
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133, 1155,136,138,139,141
Coe, Eugene 138 *Colorado Fuel & Iron Corporaction, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 138 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136
Coe, Eugene 138 *Colorado Fuel & Iron Corporaction, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 138 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136
Coe, Eugene 138 *Colorado Fuel & Iron Corporaction, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 138 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136
Coe, Eugene 138 *Colorado Fuel & Iron Corporaction, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 138 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133, 135,136,138,139,141 Eighmy Equipment Company 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 135,136,138,139,141 Eighmy Equipment Company 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133 Famalette Equipment Company, Frank Frank 137, 143
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 135,136,138,139,141 Eighmy Equipment Company 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133 Famalette Equipment Company, Frank Frank 137, 143
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 135,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133 Famalette Equipment Company, Frank Firestone Tire & Rubber Co. 23
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 135,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133 Famalette Equipment Company, Frank Firestone Tire & Rubber Co. 23
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135. 135,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 138 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Eisher Contracting Co. 187
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 106 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 135,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Fisher Contracting Co. 139
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 138 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133, 155,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 138 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Fisher Contracting Co. 137 Flack Equipment Co. 139 Ford Motor Company
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 135, 135,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 138 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Fisher Contracting Co. 139 Ford Motor Company, Industrial Engine Dept. 77
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133. 135,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Fisher Contracting Co. 139 Ford Motor Company, Industrial Engine Dept. 77
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 138 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133, 155,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 138 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Fisher Contracting Co. 139 Ford Motor Company, Industrial Engine Dept. 77 Ford Motor Company, Truck Division 34 & 35
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 138 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133, 155,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 138 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Fisher Contracting Co. 139 Ford Motor Company, Industrial Engine Dept. 77 Ford Motor Company, Truck Division 34 & 35
Coe, Eugene 138 *Colorado Fuel & Iron Corporation, The 83 Columbus McKinnon Chain Corporation 145 Consolidated Diamond Tool Corp. 166 Contractors Machinery Company 139 Coogan Gravel Co. 142 Cudebec, Sid 138 *Cummer & Son Co., The F. D. 130 D-A Lubricant Company, Inc. 145 Deatherage & Son, Geo. E. 137 Dietz Co., R. E. 22 Dodson, Herschel 143 Downers Grove, Village of 133 Earle Equipment Co., The 138, 141 East Hartford Equipment Co. 133. 135,136,138,139,141 Eighmy Equipment Company 136 Erie Builders Concrete Co. 136 Erie Strayer Co. 97 Etnyre & Co., E. D. 116 Euclid Shale Brick Co., The 133 Famalette Equipment Company, Frank 137, 143 Firestone Tire & Rubber Co. 23 Fishel, Al 140 Fisher Contracting Co. 139 Ford Motor Company, Industrial Engine Dept. 77

Gahagan Dredging Corp. 105 Galion Iron Works & Mfg. Co., The 21 Garrison Spillway Constructors 135 Gar Wood Industries, Inc. 14, 29
General Motors Corporation — Euclid Div. 80 & 81 General Roads Machines, Inc. 31
B. F. Goodrich Tire & Equipment Co
Graves Brothers, Contrs. 143 Griffin, Larry 138
Hercules Motors Corporation 101 Homelite, A Division of Textron,
Incorporated 48 & 40
Hotel Southmoor 146
Frank G. Hough Co., The 24 & 25
Hotel Hollenden
Tryster Company
Illinois Road Equipment Co. 134 Inter-American Machinery Company 136 International Harvester Company —
Construction Equip. Div. 12 & 13, 82 International Harvester Company,
Drott Div. 17 International Harvester Company,
Truck Div. 43
International Salt Co., Inc. 39 Iowa Manufacturing Company 99
Jackson Vibrator, Inc. 125 Jarco Corporation 143
Kaiser-Perini-Walsh 134 Koehring Company 10 & 11
Laclede Steel Company 26 LeTourneau-Westinghouse
Company
Company 69, 71, 73, 75 Liberty Mutual Insurance
Company 110 & 111 Lubrecht, III, William 140, 141
Lundin, Ed
MacNeal, Inc., Donald B
Maintenance Co., Inc., The 142
McClung-Logan Equipment Co., Inc. 136
Miller Equipment Co. 136
Midwest Generator Company 139 Miller Equipment Co. 136 Mississippi Valley Equipment
Co
Modern Foundations, Inc
Industrial Division
Nelson Iron Works, N. P. 141
O'Brien Equipment Company139
Ohio Rental Equip. Corp. 138 Onan & Sons, Inc., D. W. 105
Ottawa Steet Division, L. A. Young
Spring and Wire Corporation 88 Owen Bucket Co., The 32
Pacific Diesel Sales Co. 137 Paragon Equipment Company 139 Pen Machinery Co. Inc., H. O. 143 Peoria Tractor & Equipment Co. 136
Pen Machinery Co. Inc. H. O. 148
Peoria Tractor & Equipment Co. 136
Peterson Brothers
Peterson Brothers 140 Peterson, Wm. D. 136
Philadelphia Transformer Co. 138
Power Brake and Equipment, Inc 140 Power-Pack Conveyor Co
Preco Incorporated

Quinn Wire & Iron Works 74 Remington Arms Company, Inc., Industrial Sales Division 6 Reo Motors, Inc. 40 & 41 Roche Estimating Methods 117 Roebling's Sons Corporation, John A. 42 Progers Bros. Corp. 90 Ruemelin Mfg. Co. 74 \$ & G Parts 146 Scully Company, O. 142 Sheaf & Co., Inc., Geo. 133,135 Simplicity System Company, The 112 Southern Tire Company 78 Southwest Welding & Manufacturing Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Swerdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The 45 There Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 *Timken Roller Bearing Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United States Rubber Company 134 Vandeventer Auto Sales 142 United States Rubber Company 134 Wainer Brothers, Inc. 141 Waikesha Motor Company 134 Wainer Brothers, Inc. 141 Waikesha Motor Company 126 Wickwire Equipment Company 134 Wainer Brothers, Inc. 141 Waikesha Motor Company 138 Westbrook Hotel, The 102 White Manuface 119 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wides Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wides Supply Co. 142	rutinan, 1., 1
Reo Motors, Inc. 40 & 41 Roche Estimating Methods 117 Roebling's Sons Corporation, John A. 42 Rogers Bros. Corp. 90 Ruemelin Mfg. Co. 74 S & G Parts 134 Salem Tool Co., The 146 Scully Company, O. 142 Sheaf & Co., Inc., Geo. 133,135 Simplicity System Company, The 112 Southern Tire Company 78 Southerst Welding & Manufacturing Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Swerdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The 145 Thorp Finance Corporation 102 Thurman Machine Company 100 *Timken Roller Bearing Company, The 15 Thorp Finance Corporation 102 Thurman Machine Company, The 17 Truck Tire Department 46 & 47 *United States Rubber Company 134 Vandeventer Auto Sales 142 Unit Crane & Shovel Corp. 28 United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron 179 Wilson Machinery & Supply Co. 138 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 138 Wyatt Machinery Co., C. G. 143	Quinn Wire & Iron Works
Reo Motors, Inc. 40 & 11 Roche Estimating Methods 117 Rocbling's Sons Corporation, John A. 42 PRogers Bros. Corp. 90 Ruemelin Mfg. Co. 74 \$ & G Parts 134 Salem Tool Co., The 146 Scully Company, O. 142 Sheaf & Co., Inc., Geo. 133,135 Simplicity System Company, The 112 Southern Tire Company 78 Southwest Welding & Manufacturing Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Oil Company (Indiana) 132 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The — Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels Thew Shovel Company, 100 *Timken Roller Bearing Company, The Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, The 17 Troyer Equipment Co., 28 United Southern Contractors, Inc. 138 *United States Rubber Company 27 United States Rubber Company 134 Vandeventer Auto Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waikesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 138 Woold & Sons, Inc., Clyde W. 139 Woold Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Remington Arms Company, Inc.,
Reo Motors, Inc. 40 & 11 Roche Estimating Methods 117 Rocbling's Sons Corporation, John A. 42 PRogers Bros. Corp. 90 Ruemelin Mfg. Co. 74 \$ & G Parts 134 Salem Tool Co., The 146 Scully Company, O. 142 Sheaf & Co., Inc., Geo. 133,135 Simplicity System Company, The 112 Southern Tire Company 78 Southwest Welding & Manufacturing Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Oil Company (Indiana) 132 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The — Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels Thew Shovel Company, 100 *Timken Roller Bearing Company, The Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, The 17 Troyer Equipment Co., 28 United Southern Contractors, Inc. 138 *United States Rubber Company 27 United States Rubber Company 134 Vandeventer Auto Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waikesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 138 Woold & Sons, Inc., Clyde W. 139 Woold Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Industrial Sales Division 6
Ruemelin Mfg. Co. 74 S & G Parts	Reo Motors, Inc. 40 & 41
Ruemelin Mfg. Co. 74 S & G Parts	Roche Estimating Methods 117 Roebling's Sons Corporation,
S & G Parts	John A. 42
S & G Parts	Rogers Bros. Corp. 90
Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The— Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 18 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co. 133 Whist Gouthern Contractors, Inc. 138 *United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	
Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The— Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 18 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co. 133 Whist Gouthern Contractors, Inc. 138 *United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	S & G Parts
Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The— Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 18 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co. 133 Whist Gouthern Contractors, Inc. 138 *United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Salem Tool Co., The 146
Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The— Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 18 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co. 133 Whist Gouthern Contractors, Inc. 138 *United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Scully Company, O. 142
Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The— Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 18 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co. 133 Whist Gouthern Contractors, Inc. 138 *United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Simplicity System Company The 119
Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The— Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 18 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co. 133 Whist Gouthern Contractors, Inc. 138 *United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Southern Tire Company 78
Co., Construction Machinery Div. 50 Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 8 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co., Stanley B. 142 Twin Disc Clutch Company, The 170 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United States Rubber Company 70 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United States Rubber Company 71 Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Roop — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	
Standard Oil Company (Indiana) 132 Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 18 & 9 Thorp Finance Corporation 102 Thurman Machine Company, 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United States Rubber Company — Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 138 Wood & Sons, Inc., Clyde W. 139 Woold Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Co., Construction Machinery Div. 50
Standard Steel Corporation 129 Standard Steel Works, Inc. 131 Stoody Company 94 Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The — Asphalt Sales Div. Back Cover Texas Company, The 45 There Shovel Company, The 45 There Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 *Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United States Rubber Company — Truck Tire Department 46 & 47 *United States Rubber Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Weisbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Standard Oil Company (Indiana) 139
Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank	Standard Steel Corporation 129
Sverdrup & Parcel Engineering Co. 133 Swabb Equipment Co., Inc., Frank	Standard Steel Works, Inc. 131
Swabb Equipment Co., Inc., Frank 133, 137, 138 Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The 182 Asphalt Sales Div. Back Cover Texas Company, The Lubricants and Fuels 8 & 9 Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United States Rubber Company—Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 138 Woold Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Stoody Company
Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons. Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The — Asphalt Sales Div. Back Cover Texas Company, The	Carabb Parisiment Co Inc
Swenson Spreader & Mfg. Co. 126 Syntron Company 108 Tallman, Frank Benson 143 Terteling & Sons. Inc., J. A. 141 Testing Service Corporation 137 Texas Company, The — Asphalt Sales Div. Back Cover Texas Company, The	Frank
Tallman, Frank Benson 143 Terteling & Sons, Inc., J. A. 141 Testing Service Corporation 157 Texas Company, The — Asphalt Sales Div. Back Cover Texas Company, The	Swenson Spreader & Mfg. Co. 126
Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company — Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	
Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company — Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Tallman, Frank Benson 143
Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company — Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Terteling & Sons, Inc., J. A. 141
Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company — Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Testing Service Corporation 137
Thew Shovel Company, The 45 Thorp Finance Corporation 102 Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company — Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Texas Company, The —
Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company— Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope—A Product of the Colorado Fuel and Iron Corp. 33 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	
Thurman Machine Company 100 Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company— Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope—A Product of the Colorado Fuel and Iron Corp. 33 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Lubricants and Fuels 8 & 9
*Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company— Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope—A Product of the Colorado Fuel and Iron Corp. 33 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Thew Shovel Company, The
*Timken Roller Bearing Company, The Front Cover Tractor & Equipment Co. 133 Troyer Equipment Co., Stanley B. 142 Twin Disc Clutch Company, Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company— Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope—A Product of the Colorado Fuel and Iron Corp. 33 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Thurman Machine Company 100
Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company— Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope—A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	* Limbon Poller Rearing Company
Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company— Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope—A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Tractor & Fauinment Co 133
Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company— Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope—A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Trover Equipment Co. Stanley B. 142
Hydraulic Division 76 Udelson Trucks Sales 142 Unit Crane & Shovel Corp. 28 United Southern Contractors, Inc. 138 *United States Rubber Company — Truck Tire Department 46 & 47 *United Steel Fabricators, Inc. 79 Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waikesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Twin Disc Clutch Company.
Truck Tire Department	Hydraulic Division
Truck Tire Department	Udelson Trucks Sales 142
Truck Tire Department	Unit Crane & Shovel Corp. 28
Truck Tire Department	United Southern Contractors, Inc 138
Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	*United States Rubber Company —
Valley View Equipment Company 134 Vandeventer Auto Sales 134 Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	*United Steel Fabricators, Inc. 79
Wainer Brothers, Inc. 141 Waukesha Motor Company 38 Westbrook Hotel, The 102 White Manufacturing Company 126 *Wickwire Rope — A Product of the Colorado Fuel and Iron Corp. 33 Wilson Construction Corporation 139 Wilson Machinery & Supply Co. 142 Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Valley View Equipment Company 134 Vandeventer Auto Sales 134
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Wainer Brothers, Inc. 141
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Waukesha Motor Company 38
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Westbrook Hotel, The 102
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	White Manufacturing Company 126
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	*Wickwire Rope - A Product of the
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Colorado Fuel and Iron Corp 33
Winslow Scale Company 98 Wood & Sons, Inc., Clyde W. 139 World Wide Supply Co. 138 Wyatt Machinery Co., C. G. 143	Wilson Construction Corporation 139
	Window Scale Company Co
	Wood & Sons Inc. Clude W. 190
	World Wide Supply Co. 139
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Anybody ever tell you there's no difference in parts?

Take sprockets, for example. Caterpillar original sprockets feature deep-hardened teeth with tough cores to withstand shock loads. CAT* original idlers have steel disc construction, with steel treads flame-hardened for greater wear. Cat bellows seals are of self-aligning facetype design. They help keep lubricant in and dirt out, even on the dustiest job. You're sure of new machine performance with original parts like these.

With substitute parts, can you be sure of anything?

Better see your Caterpillar Dealer's Parts Representative—and get Cat original parts every time.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.



Caterpillar sprockets, idlers and seals are the result of over 50 years of track-type tractor manufacture. So don't be fooled — there is a difference in parts. Why take chances with substitutes?

CATERPILLAR*



. . for more details circle 191, page 16

Paves 26,000-vehicle-a-day boulevard with hot-mix Texaco Asphaltic Concrete





Governor Printz Boulevard in Wilmington, Del., one of numerous major traffic arteries throughout America to be paved with heavy-duty Texaco Asphaltic Concrete.

CONTRACTOR — George and Lynch, Wilmington, Del.

Governor Printz Boulevard in Wilmington, Del., is one of that State's most important traffic arteries. Last year, when the average 24-hour traffic on the boulevard passed 26,000 vehicles, steps had to be taken to relieve congestion.

The boulevard has since been widened, then resurfaced completely with a hot-mix, hot-laid wearing surface of Texaco Asphaltic Concrete, spread to a compacted thickness of three inches.

Texaco Asphaltic Concrete is a heavy-duty pavement, whose resilient, flexible qualities enable it to absorb punishing impact year after year with a minimum of upkeep. It is the ideal pavement wherever heavy traffic must be served, including turnpikes, vehicular tunnels or bridges, important city streets and trunk highways.

In addition to rugged durability and low maintenance cost, Texaco Asphaltic Concrete has other important advantages for road builder and motorist. It is ready for traffic as soon as compacted. Its highly skid-resistant texture and the sharp visibility of traffic lines on its dark surface are important aids to safe driving. Its resilience and freedom from joints insure lasting driving comfort for motorists.

Helpful information on Hot-mix Asphaltic Concrete is supplied in the booklet, "Texaco Asphalt Paving — Plant-mixed Types." This free publication can be secured without obligation by writing our nearest office.



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